MODERN TROLLEY STATION DESIGN GUIDE

SEPTA SUBURBAN TRANSIT DIVISION

ROUTES 101 & 102

MAY 2018

DELAWARE VALLEY
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REGIONAL
PLANNING COMMISSION

The Delaware Valley Regional Planning Commission is the federally designated Metropolitan Planning Organization for a diverse nine-county region in two states: Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer in New Jersey.

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

DVRPC's vision for the Greater Philadelphia Region is a prosperous, innovative, equitable, resilient, and sustainable region that increases mobility choices by investing in a safe and modern transportation system; that protects and preserves our natural resources while creating healthy communities; and that fosters greater opportunities for all.

DVRPC's mission is to achieve this vision by convening the widest array of partners to inform and facilitate data-driven decision-making. We are engaged across the region, and strive to be leaders and innovators, exploring new ideas and creating best practices.

DVRPC is funded through a variety of funding sources including federal grants from the U.S. Department of Transportation's Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), the Pennsylvania and New Jersey departments of transportation, as well as by DVRPC's state and local member governments. The authors, however, are solely responsible for the findings and conclusions herein, which may not represent the official views or policies of the funding agencies.

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Introduction:

SEPTA is preparing for a once-in-a-generation replacement of its trolley fleet. More than a simple vehicle replacement, the Trolley Modernization program will fundamentally change the way SEPTA's eight trolley routes operate.

Trolley Modernization will require SEPTA to comply with the Americans with Disabilities Act (ADA) on its trolley routes. Beyond legal compliance, new trolleys offer opportunities to improve operational performance and passenger experience. New vehicles will also trigger changes to the streetscape, stations, and maintenance facilities.

This report presents conceptual designs for modern trolley stations on routes 101 and 102 in Delaware County. The designs build upon DVRPC's 2017 *Modern Trolley Station Design Guide* (Pub. #15014), which focused on SEPTA's six City Transit division trolley routes (Routes 10, 11, 13, 34, and 36).

INTRODUCTION

Project Background:

SEPTA's 37 year-old trolley fleet is approaching the end of its useful lifespan. Unless they are replaced, aging vehicles will cause inconvenient and expensive stresses on the system. Steadily growing ridership currently strains capacity on both City- and Suburban Transit division routes. Perhaps most importantly, existing trolley vehicles predate the Americans with Disabilities Act (ADA), excluding passengers with mobility challenges.

It is not feasible to retrofit SEPTA's existing vehicles to achieve ADA compliance, and as a result, SEPTA must replace its fleet through a multifaceted program known as Trolley Modernization.

Trolley Modernization will not only bring SEPTA into ADA compliance, but will offer enhanced service to all passengers. Newer light rail vehicles have lower vehicle floors, passenger-activated wheelchair ramps, and new on- or off-board fare payment to ease boarding. Likewise, longer vehicles with efficient seating arrangements help increase capacity. These changes will open trolley service to disabled passengers for the first time and speed up service for all. None of these service improvements are possible, however, unless trolley stations are compatible with modern trolley vehicles.

SEPTA is pursuing a multi-year planning effort to ensure a smooth roll-out of its new fleet. This effort includes internal research to determine SEPTA's technical needs—analyzing, for instance, capacity issues at maintenance facilities—as well as studies by contractors, such as a comprehensive study of existing track geometry using LiDAR, a surveying tool that uses laser imaging to take precise 3D measurements.

Figure 2 | A Route 101 trolley in downtown Media, PA

Likewise, SEPTA is collaborating with partner agencies and local governments to prepare for the changes to shared infrastructure that will come with Trolley Modernization. DVRPC's *Modern Trolley Station Design Guide* studies are examples of this collaboration.

The first *Modern Trolley Station Design Guide* study (https://www.dvrpc.org/Products/15014/) developed conceptual designs for stations that would be compatible with modern trolley vehicles. That report focused on SEPTA's six trolley routes in its City Transit division, which run primarily in Philadelphia, and thus responded to streetscape challenges that are specific to Philadelphia.

This report focuses on the two Suburban Transit division trolley routes in Delaware County, routes 101 and 102. The operating context for these two routes is, in some locations, similar to trolley routes in Philadelphia, while in other locations, the operating context is quite different. This report builds upon the conceptual designs presented in the previous guide, but takes special care to address the design challenges specific to routes 101 and 102.

Figure 3 | Passengers line up to board a Route 101 trolley at Lansdowne Avenue

Figure 4 | A Seattle Streetcar vehicle with its accessible ramp deployed

Source: Seattle Department of Transportation via Flickr (CC BY-NC 2.0)

New Vehicles, New Stations:

The transit vehicle industry has evolved significantly since 1981, when SEPTA last replaced its trolley fleet—partly in response to federal law, and partly in response to technological innovation. These changes touch all aspects of trolley service, from the way passengers pay their fares to the way vehicles receive electric power. Most relevant for the station design process are changes that affect how passengers board and alight from the vehicle.

On SEPTA's existing fleet, trolley vehicles have high floors, requiring passengers to climb a set of steps to enter through the vehicle's front door. Passengers pay their fare at a single, on-board farebox, overseen by an operator. A second set of rear doors is available for alighting only. Passengers in wheelchairs cannot board SEPTA's trolleys, and passengers with other mobility challenges, such as passengers with a cane, groceries, or a stroller, can only do so with difficulty.

Conversely, contemporary vehicles have lower floors, which facilitate accessibility in several ways. For passengers in wheelchairs, a small ramp can be quickly deployed from the vehicle, extending to a platform (see Figure 4). Passengers with other mobility challenges benefit from a much lower step into the vehicle.

Modern streetcars also feature multiple door sets, allowing passengers to board and alight quickly, as they would on a subway or Regional Rail car. The operator sits in an enclosed cab, and does not oversee fare collection. Industry-standard streetcars are also longer, articulated vehicles with greater passenger capacity than their predecessors.

	Vehicle floor height	Fare payment	Accessible boarding	Number of doors	Practical passenger capacity
Existing Suburban Fleet	3'	Farebox at front door	None	1 for boarding and alighting (front), 1 for alighting only (rear)	50 seated + 17 standing
Modern Vehicles	Typically 14"	On- or off-board fare payment that does not involve the operator	Directly from platform (level), or with passenger deployed ramp (near-level)	2–4, all doors used for both boarding and alighting	60 seated + 55 standing

Table 1 | Existing and industry-standard vehicle comparison

These advances in vehicle technology will only be compatible with SEPTA's system—and will only comply with the ADA—if paired with modern, accessible stations.

Today, passengers board and alight SEPTA's suburban trolleys in a variety of ways. Some stops are bona fide stations, with long platforms, benches, and shelters. At other stops, passengers cross a parking lane to enter trolley vehicles or board trolleys from an active travel lane.

All modern trolley stations will require platforms that meet key dimensional standards, including:

- HEIGHT: Platforms must be high enough that a modern trolley's wheelchair ramp can extend to the platform, and walking passengers can step onto the vehicle with minimal effort. (See Figure 5.)
- LENGTH: Platforms must be long enough to allow boarding and alighting through all of the vehicle's doors. (See Figure 6.)
- WIDTH: Platforms must be wide enough that a passenger in a wheelchair has enough space to board or alight the vehicle. (See Figure 7.)

A station that meets these standards will require changes to existing infrastructure. In fact, no station in SEPTA's Suburban Transit Division fully meets these criteria today. Some stations could be modernized with relatively minor retrofits, for instance, adding 4 inches of height to an existing platform. Other stations, such as those on State Street in Media Borough, will require a complete transformation of the street and station.

New stations may extend into adjacent roads or property, alter traffic patterns, affect on-street parking, or change the way passengers transfer to buses or trains. This report identifies the impacts of modernizing stations so that SEPTA and stakeholders along Routes 101 and 102 understand the trade-offs that will occur when stations are updated.

In some cases, modernizing a given station may not be possible from a physical perspective, or may not be feasible from a fiscal perspective. In order to respond to those constraints, SEPTA must work with local officials to move or combine stops along routes 101 and 102. On a systemwide basis, this is known as "stop consolidation." (Limitations on station construction are explored in detail in Chapter 3: Design Assumptions.)

These constraints present difficult choices for SEPTA and its Trolley Modernization project partners. Constructibility issues must be understood on a station-by-station basis, but SEPTA's strategy for stop consolidation must be made on a

Figure 5 | Platform Height

This Portland Streetcar platform is high enough to provide convenient access to the vehicle. Note the difference in height between the platform area and the sidewalk.

Source: Michael Barera via Wikimedia Commons (CC BY-SA 4.0)

Figure 6 | Platform Length

This streetcar platform in Toronto is long enough to accommodate all vehicle doors.

Source: Tom Page via Wikimedia Commons (CC BY-SA 2.0)

systemwide basis. Cooperation with local officials and neighbors will be critical to ensuring modern stations are sited appropriately and connect to the surrounding street and sidewalk network.

This report provides an initial look at the constraints to station construction, and an explanation of the requirements of a modern station. The ultimate outcomes—including how to pursue stop consolidation—however, must be decided collaboratively between SEPTA, local, county, and state officials.

Figure 7 | Platform Width

A passenger in a wheelchair boards the Portland Streetcar. The platform meets the edge of the vehicle and offers waiting and landing space for passengers in wheelchairs.

Source: Steve Morgan via Wikimedia Commons (CC BY-SA 3.0)

Stakeholder Collaboration:

A steering committee of local, county, and state officials has informed this guide's station designs. Representatives from SEPTA and DVRPC met with the full steering committee to introduce the Trolley Modernization program, discuss the elements of station design, and to present feasible stop design options. The project team also held smaller meetings with representatives from Media Borough and Aldan Borough. Each of these municipalities features trolley service in mixed traffic, meaning new stations will have greater streetscape impacts here than in municipalities with off-street stations only.

Trolley Modernization's success depends on collaboration with local, county and state officials, passengers, residents, and business owners. This guide's concept-level station designs are intended as a toolbox for planners and designers, and flexibility in design standards will be essential as Trolley Modernization moves forward. Designers should expect to iterate upon this guide's station designs and stop locations in collaboration with many stakeholders.

In one recent example, Upper Darby Township received a 2017 Transportation and Community Development Initiative (TCDI) grant for the *Multimodal Modernization Study of the Garrett Road Corridor*. That project's consultant team is developing a design plan for a 1.25-mile stretch of Garrett Road, alongside the Route 101/102 Trunk Line, which acknowledges this guide's accessibility standards, and facilitates safe access to trolley stations. As corridor planning and construction projects progress, the station concepts in this guide should serve as a resource to communities along routes 101 and 102.

STEERING COMMITTEE	
Aldan Borough	Springfield Township
Clifton Heights Borough	Upper Darby Township
Collingdale Borough	Delaware County Planning Department
Media Borough	Delaware County Transportation Management Association
Nether Providence Township	Office of PA Senator Thomas McGarrigle (26th District)
Sharon Hill Borough	SEPTA

Table 2 | Steering committee members

INTRODUCTION

How To Use This Guide:

The *Modern Trolley Station Design Guide* is a reference for planners, engineers, officials, and community members to understand the goals of the Trolley Modernization program. It outlines the elements of station designs, and explains their intent and associated trade-offs.

SEPTA staff and consultants should look to the guide to inform both their preliminary designs, and their outreach to communities. The guide's conceptual level of detail is meant to help diverse stakeholders collaborate towards effective implementation. In other words, these conceptual designs are the start of the design process, not the end.

Subsequent chapters include:

CHAPTER 2: EXISTING CONDITIONS provides an overview of the current operating context for routes 101 and 102.

CHAPTER 3: DESIGN ASSUMPTIONS introduces expectations about regulations and industry standards for modern trolleys. These assumptions dictate the design, dimensions, and spacing of stations.

CHAPTER 4: STATION DESIGNS illustrates the station layout options for the system's various right-of-way contexts. This section should function as a designer's toolbox, and provide a concept-level introduction to station design.

APPENDIX A: STATION PROFILES is a first-look index at each station on routes 101 and 102. The station profiles provide field observations and insights into the relative challenges of modernizing a given station.

Other Guidance:

This document relies on the following published design guides to inform its station designs. They should be considered supplementary material for designers.

- DVRPC Modern Trolley Station Design Guide: City Transit Division
- National Association of City Transportation Officials (NACTO) Transit Street Design Guide
- NACTO Urban Bikeway Design Guide
- SEPTA Bus Stop Design Guidelines
- PennDOT Pub13M Design Manual Part 2: Highway Design
- PennDOT 2013 ADA Reference Guide
- NJDOT and PennDOT 2008 Smart Transportation Guidebook
- Federal Highway Administration (FHWA) Manual on Uniform Traffic Control Devices
- American Association of State Highway and Transportation Officials (AASHTO) Guide for Geometric Design of Transit Facilities on Highways and Streets
- American Public Transportation Association (APTA) Modern Streetcar Vehicle Guideline

EXISTING CONDITIONS

Figure 8 | Graphic rendering: Curb Extension Station

Existing Conditions:

Routes 101 and 102 are critical links in Greater Philadelphia's transit network, with connections to the Market-Frankford Line and Norristown High Speed Line. They also supply essential mobility within Delaware County.

These two routes have served Delaware County for over a century, and mature communities have grown around them. In many cases, trolley stations are the focal point of walkable neighborhood centers. The infrastructure on routes 101 and 102 reflects a long legacy, which includes ownership by several past transit operators and changing service patterns.

The following chapter identifies the existing conditions of physical infrastructure and service patterns on routes 101 and 102.

Routes:

Trolley routes 101 and 102, also known as the Media/Sharon Hill Lines, provide service to 50 stops in eight Delaware County municipalities. The eastern terminus of the routes is 69th Street Transportation Center, in Upper Darby Township, a multimodal hub with transfers to the Market-Frankford Line and the Norristown High Speed Line, and 18 bus lines.

From 69th Street westward to Drexel Hill Junction, the 101 and 102 share a right-of-way, known as the "trunk line." From Drexel Hill Junction, Route 101 continues west, terminating at Orange Street, in Media Borough, while Route 102 extends south to Sharon Hill Station in Sharon Hill Borough.

Route 101 runs for 8.6 miles (including the trunk line), providing service to stops in Upper Darby Township, Springfield Township, Nether Providence Township, and Media Borough. Route 102 runs for 5.3 miles (including the trunk line), providing service to stops in Upper Darby Township, Clifton Heights Borough, Aldan Borough, Collingdale Borough, and Sharon Hill Borough.

Routes 101 and 102 were built between 1906 and 1917 by the Philadelphia & West Chester Traction Company in what was then mostly rural hinterland, spurring abundant suburban growth. Some of these communities retain the mid-to-low population density stereotypically associated with suburbs. Others, such as Upper Darby, Clifton Heights, and Collingdale, are among the top 1 percent most densely populated municipalities nationwide.

Figure 9 | Route Map

Source: SEPTA, 2011

Service:

Trolley routes 101 and 102 offer frequent service during peak commute times, with headways as frequent as 7 minutes on Route 101. (See Tables 3 and 4.) Because routes 101 and 102 share the trunk line, riders between Drexel Hill Junction and 69th Street Transportation Center enjoy very frequent service more reminiscent of urban transit service than suburban. Service frequencies are somewhat limited, on the other hand, by single-track portions of each route (discussed in detail on p. 11).

Ridership:

Routes 101 and 102 have the 5th and 6th highest average daily ridership, respectively, of all routes in SEPTA's Suburban Transit Division.

Ridership on both lines has increased consistently over the last decade. Since Fiscal Year 2007, Route 101's average weekday ridership has grown by 8.5 percent, while Route 102's average weekday ridership has grown by 22.5 percent. (See Table 5.)

Contemporary trolley vehicles offer significantly greater passenger capacity compared to older trolleys. This increase in capacity will help SEPTA accommodate growing ridership while controlling vehicle acquisition costs.

	A.M. Peak	Base	P.M. Peak	Early Evening	Late Night
Weekday	7	20	8	30	60
Saturday	30	30	30	60	60
Sunday	30	30	30	60	60

Table 3 | Route 101 service frequency (in minutes)

Source: SEPTA Route Statistics, 2016

	A.M. Peak	Base	P.M. Peak	Early Evening	Late Night
Weekday	15	20	15	30	30
Saturday	30	30	30	60	60
Sunday	30	30	30	60	60

Table 4 | Route 102 service frequency (in minutes)

Source: SEPTA Route Statistics, 2016

Fiscal Year	Average Weekday Riders	
	Route 101	Route 102
2007	3,905	3,343
2008	4,280	3,579
2009	4,239	3,468
2010	3,600	2,946
2011	3,500	2,900
2012	4,440	3,576
2013	4,100	4,045
2014	4,086	4,043
2015	4,143	4,072
2016	4,235	4,095

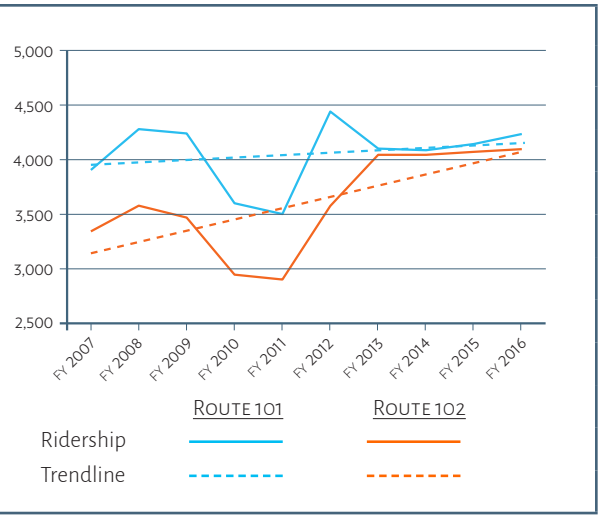


Table 5 | Average weekday ridership, FY2007-2016

Source: SEPTA, 2017

Note: Between March 2010 and August 2010 (spanning FYs 2010 and 2011), SEPTA performed infrastructure upgrades to the Media/Sharon Hill lines, which required shuttle bus service. This service interruption is reflected in reduced ridership for FYs 2010 and 2011.

Exclusive Right-of-Way vs. Mixed Traffic:

For most of their respective alignments, the Media/Sharon Hill lines operate in dedicated rights-of-way that exclude auto traffic. Exclusive rights-of-way are common in light rail systems across North America, and is the key distinction between light rail service and streetcar service, which typically runs in mixed traffic. In general, exclusive trolley rights-of-way are preferable to mixed-traffic operations, as they minimize conflicts with auto traffic, allowing faster and more reliable service.

Route 101 operates in an exclusive right-of-way between Providence Road and 69th Street Transportation Center, sharing the trunk line segment with Route 102. Route 102 operates in an exclusive right-of-way between Sharon Hill and North Street, and again between Springfield Road and 69th Street Transportation Center.

Route 101 and 102 each run for a stretch in mixed-traffic roadways. In Media, Route 101 runs for two thirds of a mile on State Street, the borough's main commercial corridor. This segment features trolley tracks in the center of the street, partially occupying two travel lanes. Route 102 runs for three fourths of a mile in mixed traffic through Aldan.

Modern trolley stations in mixed traffic conditions are likely to have greater impact on the surrounding transportation network than stations in exclusive rights-of-way. Media and Aldan boroughs are examined as focus areas in Chapter 4: Station Designs.

Figure 10 | Exclusive right-of-way at Springfield Mall

Route 101 between Woodland Avenue and Beatty Road eschews the street grid, instead following natural features such as Whiskey Run, just beyond the tree line at left.

Figure 11 | Exclusive right-of-way at Walnut Street

East of Lansdowne Avenue, the trunk line runs alongside Garrett Road, a major arterial and commercial corridor (left of tracks), and Bywood Road, a neighborhood street (right of tracks.)

Figure 12 | Mixed traffic on Woodlawn Avenue, Aldan Borough

Route 102 runs in mixed traffic between Springfield Road and North Street stations. This view, at Magnolia Avenue, shows a typical cross-section for this route segment.

Figure 13 | Mixed traffic on State Street, Media Borough

Route 101 runs in the center of State Street, as seen here viewed from Plum Street. Trolley tracks are partially in each travel lane, and autos are required to yield to the trolley. This condition is unique among North American streetcar systems.

Single Track vs. Double Track:

Most of route 101 and 102 features two tracks, one for each direction, allowing oncoming trolleys to pass each other at will. Three distinct segments include only one track: 1) the on-street portion of Route 101 in Media; 2) Route 101 between Woodland Avenue and the "96 Switch" a quarter mile east of Pine Ridge; and 3) Route 102 between North Street and Sharon Hill.

According to Gannett Fleming's *Media Trolley Double-Tracking Feasibility Study*, portions of the routes were constructed with only one track in the early 20th century, but "laid out and graded in anticipation of ultimately being double-tracked" once development spurred greater travel demand.[1]

[1] Gannett Fleming. *Media Trolley Double-Tracking Feasibility Study.* Philadelphia: Gannett Fleming, 2007.

Single track segments require coordination and present limitations to service frequency, as only one vehicle may use those segments at a time. This report's station designs for off-street stations can be easily adapted to either single- or double-track conditions. Media's on-street single track segment—which runs in a unique cross-section—raises difficult station design challenges, covered in detail on pp. 27-39, Media Focus Area.

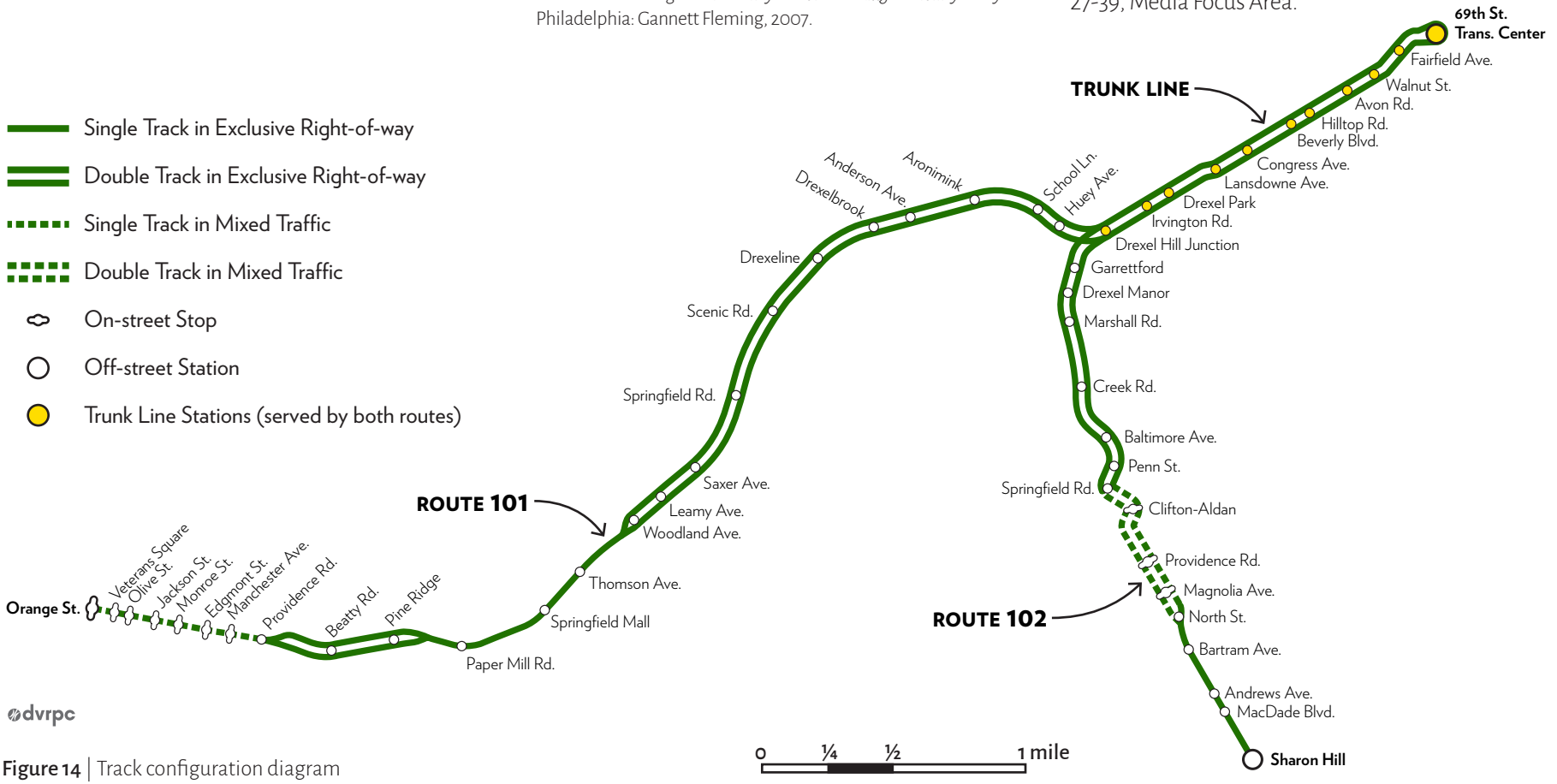


Figure 14 | Track configuration diagram

DOUBLE TRACK IN EXCLUSIVE RIGHT-OF-WAY

- Dedicated trolley right-of-way
- Boarding from inbound and outbound station platforms

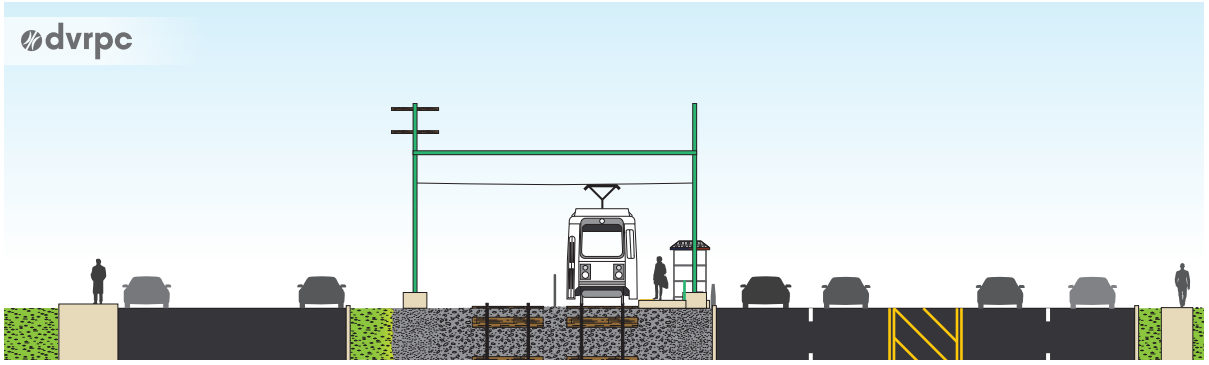


Figure 15 | Double track in exclusive right-of-way, typical cross-section

Figure 16 | Double track in exclusive right-of-way at Springfield Road, Springfield Township

SINGLE TRACK IN EXCLUSIVE RIGHT-OF-WAY

- Dedicated trolley right-of-way
- Route 101: Boarding from a single station platform;
- Route 102: Boarding from inbound and outbound station platforms

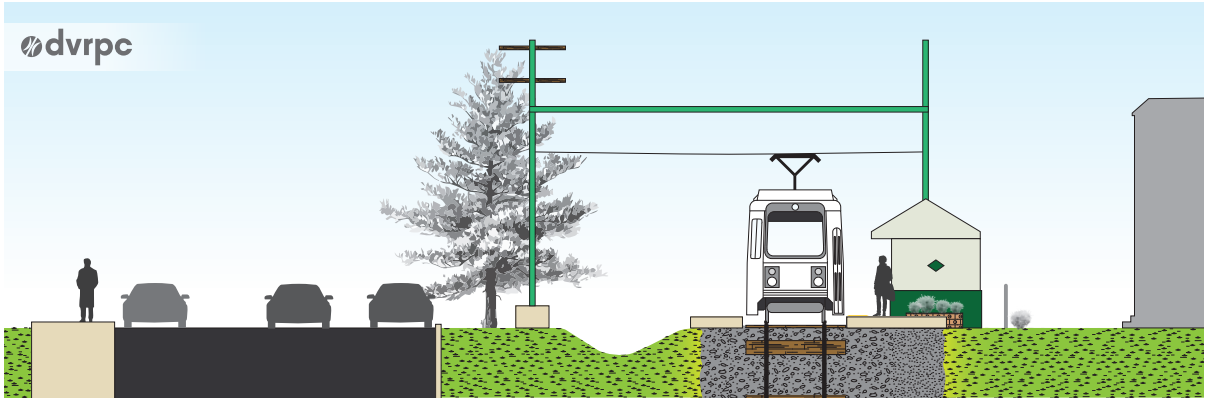


Figure 17 | Single track in exclusive right-of-way, typical cross-section

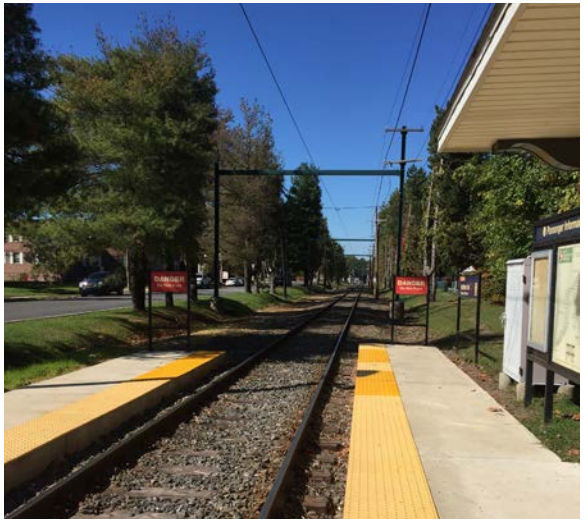


Figure 18 | Single track in exclusive right-of-way at Andrews Avenue, Collingdale Borough

DOUBLE TRACK IN MIXED TRAFFIC

- 2 travel/trolley lanes | 2 parking lanes
- Boarding from street level

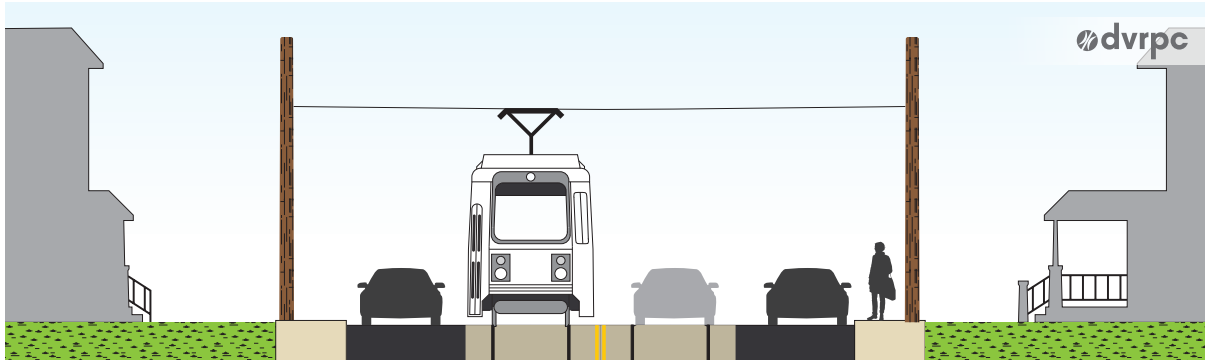


Figure 19 | Double track in mixed traffic, typical cross-section

Figure 20 | Double track in mixed traffic at Providence Road Station, Aldan Borough

SINGLE TRACK IN MIXED TRAFFIC

- 2 travel lanes | 2-direction trolley lane (overlapping travel lanes; autos must yield to trolleys) | 2 parking lanes
- Boarding from street level within travel lane

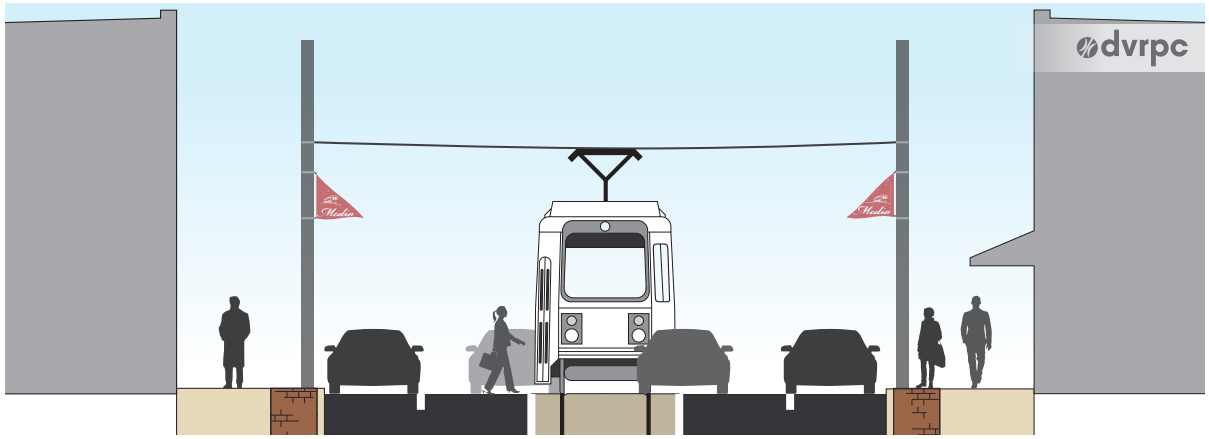


Figure 21 | Single track in mixed traffic, typical cross-section

Figure 22 | Single track in mixed traffic at Olive Street, Media Borough

Existing Trolleys:

SEPTA uses a double-ended 1981 Kawasaki LRV on routes 101 and 102. This vehicle predates the Americans with Disabilities Act of 1990 (ADA), which dictates the modern approach to accessibility. The Kawasaki LRVs have high floors, steps, and single-channel boarding, sometimes from street level (see Figure 24).

As double-ended vehicles, the LRVs on routes 101 and 102 have operator controls at each end of the vehicle. This enables them to end their routes at "stub-end" terminals (see Figure 25), rather than a loop track, as are used on the City Transit Division routes.

The contemporary vehicles that SEPTA plans to purchase will also be double-ended, and will have features such as low vehicle floors, multidoor boarding, and passenger information systems, that represent a major leap forward in terms of accessibility, passenger capacity, passenger experience, and service speed. These advances—combined with SEPTA's existing track and station infrastructure—will determine the form of modern trolley stations.

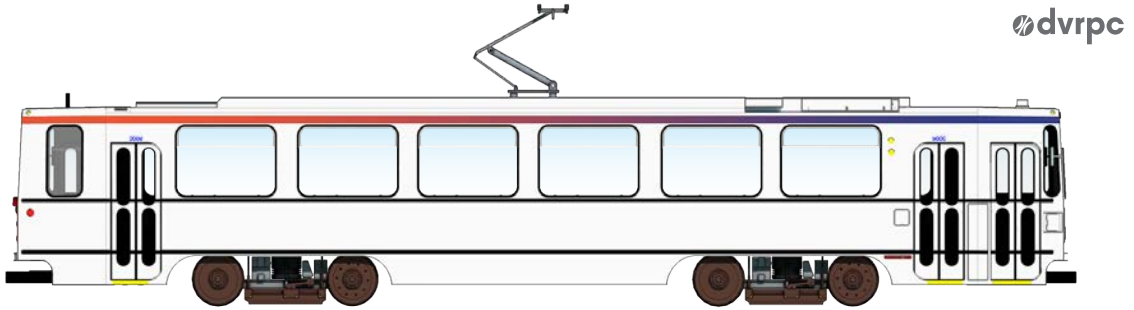


Figure 23 | Kawasaki LRV, double-ended

Dimension	Measurement
Vehicle length	53'
Vehicle width	8' - 10"
Floor height (from top-of-rail)	3'
Maximum passenger capacity	67 (50 seated, 17 standing)
Year built	1981
Fleet size (Suburban Transit Division trolleys only)	29

Table 6 | Kawasaki LRV vehicle specifications

Source: SEPTA

Figure 24 | In-street boarding, Providence Road

Figure 25 | Route 102, end-of-line

Exclusive Right-of-way Width:

Most of routes 101 and 102 operate in exclusive right-of-way. SEPTA acquired this right-of-way in 1970 when it inherited routes 101 and 102 from the Philadelphia Suburban Transportation Company.

SEPTA provided the DVRPC project team with historical right-of-way drawings that note SEPTA's ownership and measurement of the exclusive right-of-way. These drawings are used to assess the amount of right-of-way needed to accommodate an ADA-compliant platform in Appendix A:

Station Profiles. They are intended as a first look for designers to compare stations against each other, offering a sense of the *relative* difficulty of modernizing a given station. Ownership and dimensions should be checked in greater detail before producing station designs.

Trunk Line	
Station	**Right-of-Way Width**
69th Street Transportation Center	N/A
Fairfield Avenue	40'
Walnut Street	30'
Avon Road	35' *
Hilltop Road	30'
Beverly Boulevard	30'
Congress Avenue	30'
Lansdowne Avenue	60'
Drexel Park	42'
Irvington Road	42'
Drexel Hill Junction	50' *

Table 7 | Right-of-way width at stations, Trunk Line

Source: SEPTA

** Right-of-way's size varies within this station area, or is asymmetrical. Width is measured at its widest point.*

Route 101	
Station	**Right-of-Way Width**
Huey Avenue	60'
School Lane	40'
Aronimink	40'
Anderson Avenue	40'
Drexelbrook	40'
Drexeline	40'
Scenic Road	40'
Springfield Road	40'
Saxer Avenue	40'
Leamy Avenue	40'
Woodland Avenue	40'
Thomson Avenue	40'
Springfield Mall	40'
Paper Mill Road	40'
Pine Ridge	40'
Beatty Road	40'
Providence Road	40'
On-street segment, trolleys operate in mixed traffic to Orange Street.	

Table 8 | Right-of-way width at stations, Route 101

Source: SEPTA

Route 102	
Station	**Right-of-Way Width**
Garrettford	40'
Drexel Manor	40'
Marshall Road	40'
Creek Road	50' *
Baltimore Avenue	71' *
Penn Street	40'
Springfield Road	40'
On-street segment, trolleys operate in mixed traffic between Springfield Road and North Street stations.	
North Street	41'
Bartram Avenue	41' *
Andrews Avenue	41'
MacDade Boulevard	41'
Sharon Hill	70' *

Table 9 | Right-of-way width at stations, Route 102

Source: SEPTA

** Right-of-way's size varies within this station area, or is asymmetrical. Width is measured at its widest point.*

Historic Station Infrastructure:

As a retrofitting project, Trolley Modernization involves adapting legacy infrastructure to meet the needs of today's transit rider. After more than a century of operation, stations on the Media/Sharon Hill Lines are a conglomeration of transportation infrastructure. Trolley modernization will add yet another element to this historic mix.

For example, many stations feature stone shelters (see Figures 26–29), which are not only useful for waiting passengers, but also have historical significance. These stone shelters can, in many cases, be simply integrated into a modernized trolley station. In other cases, a close review of stations will be necessary to ensure that all ADA-required clearances are met with the shelters in place.

As discussed in Chapter 3: Design Assumptions, pp. 17–24, it will not be possible to modernize all existing stations. At stations that cannot be modernized, existing infrastructure may be available for adaptive reuse. One example of reuse that has already occurred is the stone shelter at Route 102's Providence Road station (see Figure 27). The shelter's roof still provides protection from the elements, but the interior has been repurposed as the Aldan Borough Historical Museum.

Figure 26 | Historic shelter: Scenic Road Station

Figure 27 | Historic shelter: Providence Road Station

Figure 28 | Historic shelter: Fairfield Avenue Station

Figure 29 | Historic shelter: Drexel Park Station

DESIGN ASSUMPTIONS

Figure 30 | Graphic rendering: One-way Street: Platform Station

Design Assumptions:

The following chapter highlights the changes in industry standards that are most relevant to designing modern trolley stations—including new vehicle capabilities and generalized vehicle dimensions—and presents a set of accessibility standards that guide station design.

The chapter follows with a discussion of several issues that will impact both the design of individual stations, and the overall implementation of the Trolley Modernization program.

Figure 31 | Seattle Streetcar: Low-floor vehicle

Source: SDOT via Flickr (CC BY-NC 2.0)

Figure 32 | MAX light rail, Portland, OR: Automatically deployed ramp

Source: Steve Morgan via Wikimedia Commons (CC BY-SA 2.0)

Figure 33 | Le Mans tramway car interior

Source: Ingolf via Flickr (CC BY-SA 2.0)

Low Floors:

Low vehicle floors facilitate boarding and alighting that is accessible for passengers with disabilities, and faster for all passengers. Modern low-floor light rail vehicles typically have between half and all of their floor area at a low height—approximately 14 inches above top-of-rail (TOR).

Automatically Deployed Ramp:

Modern low-floor trolleys use small bridgeplate ramps to provide access for passengers with mobility challenges. These ramps bridge the gap between platform edge and vehicle, and create an accessible slope between the vehicle floor height and the platform height—which may differ by several inches.

These ramps deploy automatically when activated by a passenger using a button located on both the inside and outside of the vehicle. This differs from earlier iterations of ADA-compliant boarding, which often required a transit agency employee to manually operate a lift, a time-consuming endeavor.

Double-ended Vehicles:

Like existing trolleys on routes 101 and 102, modern, industry-standard vehicles used on most new streetcar systems are double-ended. This is distinct from the CTD trolley routes, where existing infrastructure allows single-ended trolleys.

Double-ended vehicles provide operational flexibility because they can operate in either direction without a loop track at the end of the line. They also feature passenger doors on either side of the vehicle (see Figure 33, above).

Using double-ended vehicles means sacrificing some passenger capacity, as an operator's cab is needed at both ends of the vehicle, and can entail slightly higher maintenance costs than single-ended vehicles.

Figure 34 | LYNX light rail, Charlotte, NC: Multidoor boarding

Source: Brett VA via Wikimedia Commons (CC BY 2.0)

Multidoor Boarding:

Modern streetcars in North American markets typically have 2 to 5 sets of doors on each side of the vehicle, depending on the manufacturer and model. Typically one door set per car body section is equipped with a bridgeplate ramp.

Multidoor boarding allows passengers to board or alight at any door. This reduces dwell time at stations, speeding up service for passengers, and easing congestion when trolleys operate in mixed traffic.

Figure 35 | The Tide light rail, Norfolk, VA, enclosed operator cab

Source: Michael Ragsdale via Flickr (CC BY-SA 2.0)

Enclosed Operator Cab:

Contemporary streetcars are built with an enclosed cab for the operator (see Figure 35, above). Enclosed cabs with locking doors provide safety for the operator. They also foster a safer ride for passengers by limiting distractions and improving visibility for operators.

The enclosed cab prevents an operator from collecting fares as passengers board, which, as noted earlier, speeds up trolley service by reducing dwell time at stations. With the operator removed from the fare collection process, industry-standard vehicles require new methods for fare payment.

Figure 36 | Off-board fare payment machines, New York SBS

"Low-friction" Fare Payment:

All modern streetcars are built under the assumption of low-friction fare payment, a scenario in which boarding passengers no longer pay their fare single-file at an entry door. Rather, fares are collected either through off-board fare collection machines (see Figure 36, above), or on-board fare collection machines at multiple doors.

Low-friction fare payment is a prerequisite for multidoor boarding, and critical to reducing dwell time at stations.

Low-friction fare payment methods often raise concerns for transit agencies about fare evasion. To mitigate these concerns, SEPTA may consider, for instance, gating certain high-ridership stations.

Dimensional Assumptions:

This report relies on industry standards as implemented in other North American light rail and streetcar systems; SEPTA's 2015 Expression of Interest to potential trolley manufacturers; and manufacturers' responses to that Expression of Interest. These sources suggest a range of standard dimensions for modern trolley vehicles, which this report has synthesized to create a design vehicle (see Table 10).

These sources take into account existing trolley system constraints, such as track spacing and turn radii. This report assumes that existing trolleys and modern trolleys will share the system during the implementation phase.

The design vehicle reflects SEPTA's commitment to control vehicle costs by selecting an "off-the-shelf" vehicle with minimal customization, which reduces procurement costs and maintenance expenses.

Because there is no absolute consensus among the sources as to a particular dimension, the project team selected the measurements that would allow for the most flexibility in conceptual station design.

The assumed dimensions do not represent a selected or favored manufacturer, rather, they are generalizations that allow stakeholders to plan for a range of vehicle types.

The key difference between the design vehicle for routes 101 and 102 and the design vehicle for SEPTA's CTD routes is that routes 101 and 102 require a double-ended vehicle. This enables the vehicle to reach the end of the line and return in the other direction without the need for a loop track.

Dimension	Measurement
Vehicle length	80' - 0"
Vehicle width	8' - 10"
Floor height (from top-of-rail)	1' - 2"
Distance from front of vehicle to outer edge of first door	15' - 0"
Distance between outer edges of outermost doors	50' - 0"
Car configuration	Articulated
Directional configuration	Double-ended
Accessibility device	Deployable vehicle-based ramp at at least one doorway per car section

Table 10 | Vehicle dimensional assumptions

Sources: SEPTA, 2015; APTA Streetcar Subcommittee, 2015

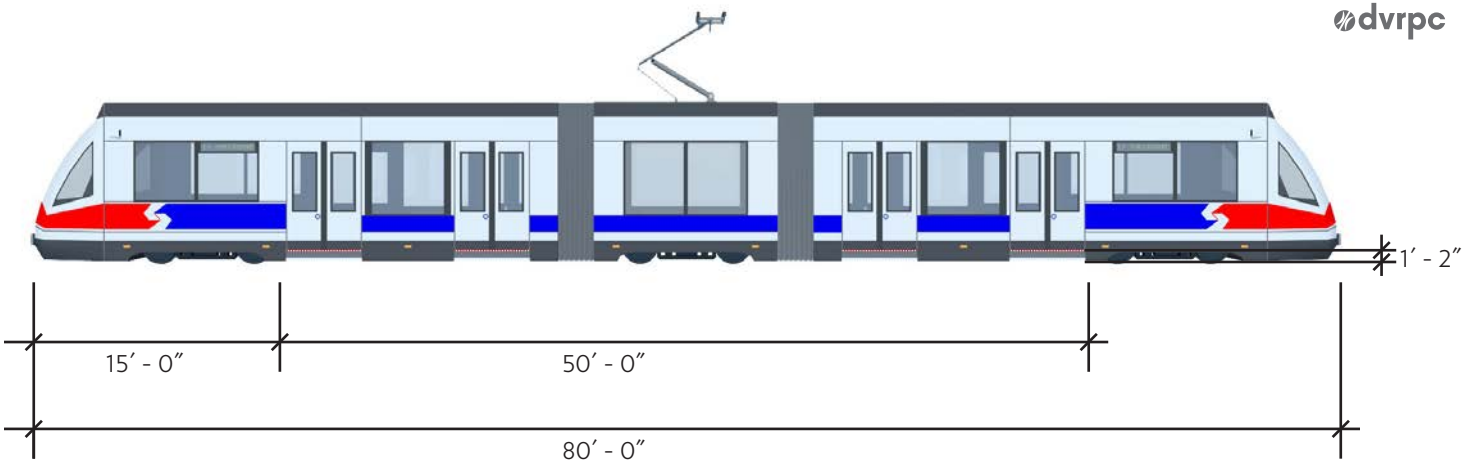


Figure 37 | Design vehicle dimensions, side elevation

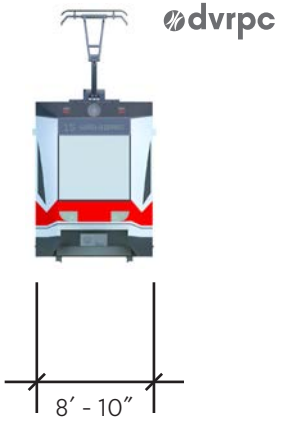


Figure 38 | Design vehicle dimensions, front elevation

Dimension	Measurement
Minimum platform width	8' - 6"
Maximum slope on a platform ramp	1:12 or 8.33%
Maximum running slope on a walking surface	1:20 or 5%
Maximum cross slope on a walking surface	1:48 or ≈2%
Clear landing space at accessible vehicle door	8' x 5'

Table 11 | Accessibility dimensional assumptions

Source: US Access Board, 2010

Principles of Universal Design
Equitable Use: *The design is useful and marketable to people with diverse abilities.*
Flexibility in Use: *The design accommodates a wide range of individual preferences and abilities.*
Simple and Intuitive Use: *Use of the design is easy to understand regardless of the user's experience, knowledge, language skills, or current concentration level.*
Perceptible Information: *The design communicates necessary information effectively to the user regardless of ambient conditions or the user's sensory abilities.*
Tolerance for Error: *The design minimizes hazards and adverse consequences of accidental or unintended actions.*
Low Physical Effort: *The design can be used efficiently and comfortably with a minimum of fatigue.*
Size and Space for Approach and Use: *Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.*

Table 12 | Principles of Universal Design

Source: Center for Universal Design, North Carolina State University, 2008. More information on Universal Design is available at their website, ncsu.edu/ncsu/design/cud/index.htm.

Accessibility Standards:

Improved access for passengers with limited mobility is one of the primary benefits of Trolley Modernization. When replacing its trolley fleet, SEPTA will be required to comply with the Americans with Disabilities Act (ADA) in the design of both vehicles, and the design of stations.

The United States Access Board is an independent federal agency that sets standards for ADA compliance. For the purposes of this report, the project team relied especially on the Access Board's ADA Standards for Transportation Facilities, which governs facilities such as station buildings and platforms, and ADA Accessibility Guidelines for Transportation Vehicles, which applies to buses, rail cars, and other public transit vehicles.

Based on a review of these ADA standards, the project team has used the assumptions in Table 11 to inform its minimum standards for station design. These dimensions are not exhaustive, nor should they necessarily be considered the advisable dimensions for any particular station design. Rather, they are building blocks that represent minimum standards that the project team used to create station designs that are both functional and accessible.

Universal Design:

This project represents an opportunity to make trolley routes more effective transportation options for people with mobility challenges—not simply ADA-compliant. In that regard, this guide strives to apply the principles of Universal Design to station concepts. Universal Design is an approach that involves designing the built environment to be intuitive and accessible to the broadest spectrum of users possible without the need for adaptation or special design (see Table 12).

Stations that embody Universal Design principles minimize the differences in user behavior between passengers with disabilities and passengers without disabilities

Where possible, this design guide seeks to implement these principles. For example, the design guide recommends providing multiple entry and exit points for boarding platforms whenever safety considerations allow. This prevents bottlenecks, and shortens the route to the platform for passengers arriving from multiple directions.

STOP CONSOLIDATION

Advances in best practices for the public transit industry are not limited to vehicle technology. Modern light rail also functions differently from a systemwide perspective compared to 1981, when SEPTA last replaced its trolley fleet—or, for that matter, compared to 1906, when routes 101 and 102 were first built.

In order to function as an effective, modern light rail system, SEPTA must develop a balanced, cost-effective strategy to consolidate existing trolley stops.

Stop consolidation has several benefits, but requires some trade-offs. An effective stop consolidation program reduces travel times for the vast majority of trolley riders. At the same time, it allows SEPTA to focus station improvements on slightly fewer locations, maximizing the use of limited funds to provide better stations than it otherwise could. The key drawback to stop consolidation is a longer walk to stations for some passengers, though those same passengers benefit from faster trolley service.

SEPTA must consider several factors while pursuing stop consolidation, among them: CONSTRUCTIBILITY, RIDERSHIP, a station's place in the broader transit NETWORK, and STATION SPACING. These factors, some of which are rigid constraints, while others are simply indicators, are discussed in greater detail on the following pages.

These factors are interrelated, so stop consolidation decisions must be made holistically along a route. Appendix A: Station Profiles provides station statistics meant to help planners and designers make stop consolidation decisions.

Constructibility:

The physical challenges of modernizing trolley stations will be an important constraint. In many cases, it would be physically impossible to retrofit existing trolley stations with ADA-compliant platforms.

There are many factors that could constrain a station's constructibility, including the amount of right-of-way space; nearby cross-streets; obstructions, such as driveways or utility poles; and curved track.

Figure 39 shows Route 102's Springfield Road station, which illustrates several constructibility constraints. The station is located on one of the sharpest curves on the route. The width of the platforms are constrained by a narrow right-of-way and steep slopes. The length of platforms is constrained at one end by Springfield Road.

Figure 39 | Constructibility: Springfield Road

Ridership:

Comparing stations' average daily ridership at trolley stops is a helpful way to compare stations for stop consolidation purposes. As a general rule, higher ridership stations should be prioritized for modernization.

With consistent ridership growth and service opened to riders with disabilities, SEPTA also must evaluate stations based on their potential for future ridership growth as new, accessible trolleys are introduced. Improvements that may facilitate this growth—such as double-tracking existing single-tracked rights-of-way, or supporting modern stations with nearby transit-supportive land uses—should be encouraged.

Figure 40 | Ridership: Lansdowne Avenue

Network:

Care should be taken to preserve convenient access to important destinations (such as schools, employment centers, commercial districts, etc.), to locations where passengers may transfer to another transit route, and to the connectivity of the surrounding street grid.

For example, Paper Mill Road station, on Route 101, is located in Smedley Park along Crum Creek (see Figure 41). This station is virtually inaccessible to pedestrians, does not offer a transfer to another SEPTA route, and is not near any residential or commercial destinations—all indicators of low performance from a "network" standpoint. It does, on the other hand, offer access to recreational resources.

Figure 41 | Network: Paper Mill Road

Station Spacing:

Stop consolidation prompts an essential trade-off in transit service planning: more stops along a route make it more convenient for passengers to access that stop, but inconveniences other passengers by slowing down service, as a transit vehicle must stop more frequently. Fortunately, there is robust data on this trade-off that can inform SEPTA as it sites its modern trolley stations.

A reasonable stop consolidation scenario would improve service speed without unduly burdening passengers. To achieve this, SEPTA relies on its internal standards for station spacing. For a major system overhaul such as Trolley Modernization, SEPTA should also rely on national best practices. SEPTA and the American Public Transportation Association's (APTA) standards are presented in Table 14. In general, higher population and commercial density warrants closer station spacing.

Comparing Table 14 to existing conditions on segments of routes 101 and 102 (see Table 13) reveals that some portions of these routes meet SEPTA's and APTA's standards, such as the off-street segment of Route 101 (between Drexel Hill Junction and Providence Road). Other segments, such as Route 101 in Media Borough, have average stop spacing far below established standards.

Route Segment	Average Stop Spacing (ft.)
Route 101 [Drexel Hill Junction–Providence Road] *Population Density: 4,140 residents/sq. mi.*	1,811
Route 101 [Providence Road–Orange Street] *Population Density: 7,184 residents/sq. mi.*	523
Route 102 [Drexel Hill Junction–Sharon Hill] *Population Density: 9,979 residents/sq. mi.*	1,133
Trunk Line [69th Street T.C.–Drexel Hill Junction] *Population Density: 11,464 residents/sq. mi.*	906

Table 13 | Stop spacing on route segments

Sources: SEPTA, 2017; Google Maps, 2017; U.S. Census, 2010

Service Type	Stop Spacing (ft.)
SEPTA suburban trolley service [Population density: 1,000–10,000 / sq. mi.]	≥ 1,320
SEPTA suburban trolley service [Population density: < 1,000 / sq. mi.]	≥ 2,640
APTA rapid street transit service [Streetcar in mixed traffic]	1,056–1,760
APTA semi-rapid transit service [Light rail with dedicated right-of-way]	1,760–3,520

Table 14 | Stop spacing standards

Sources: SEPTA, 2014; American Public Transit Association, 2009

STATION DESIGNS

Figure 42 | Graphic rendering: Curb Extension Station

Station Designs:

The following chapter presents ADA-compliant station designs compatible with SEPTA's coming trolley vehicles. Designers should use this chapter as a starting place before preliminary engineering. The designs are presented at a conceptual level of detail, and are intended as a "toolbox" for designers as they create detailed site specific plans for trolley stations. Flexibility in design standards and coordination with stakeholders are essential as designers adapt these concepts into preliminary and final designs.

The chapter begins with an explanation of the station elements common to all station types, such as accessible boarding locations, and platform height. The chapter follows with station design concepts in three groups: off-street stations, the Aldan Borough focus area, and the Media Borough focus area.

STATION ELEMENTS

Platform Elements:

The preferred size and arrangement of design elements on platforms are consistent across all station types, both in-street and in a dedicated right-of-way, except for three station types in the Media Borough Focus Area, which adapt the standards laid out below to a unique street condition. Access to the platform and its relationship to the roadway vary outside of the platform footprint. The recommendations for platform layout are distilled from ADA Access Guidelines (ADAAG), detailed in Chapter 3: Design Assumptions.

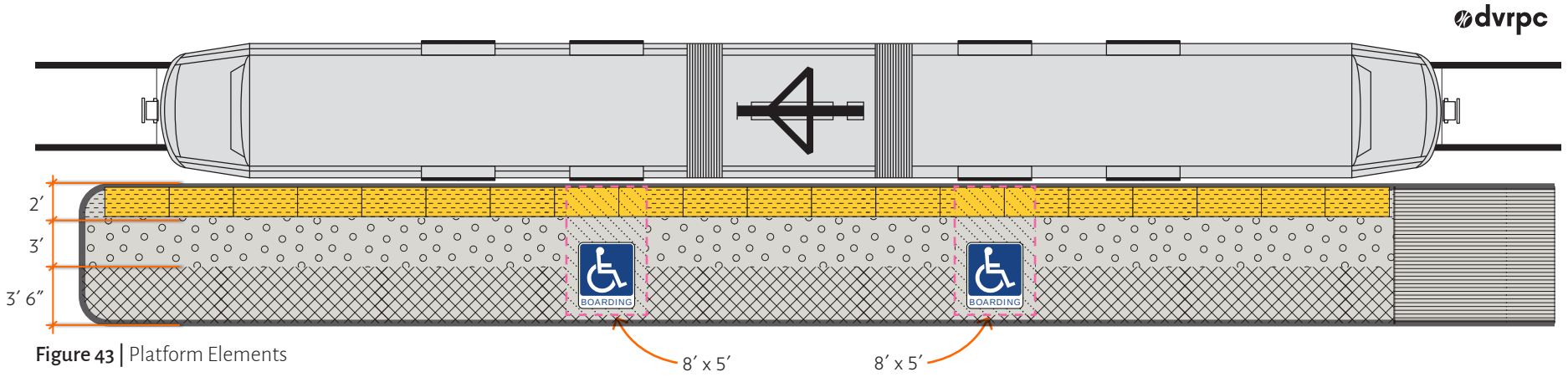


Figure 43 | Platform Elements

Platform Layout:

Platform edge: All platforms must include a 2'-wide detectable warning strip along the entire platform edge closest to the trolley.

Accessible route: A 3'-wide, minimum, accessible route must run the entire length of the platform, in compliance with ADAAG "Chapter 4: Accessible Routes." This zone must be kept clear of fixed objects or other obstructions.

Furnishing zone: A 3'–6"-wide, minimum, furnishing zone is to be located at the platform edge farthest from the trolley. This zone may be used for railing, station furniture, bicycle racks, station shelters, fare vending machines, and other station amenities. Furnishing zone objects may not encroach upon the accessible route or accessible boarding locations.

Accessible boarding locations: An 8' x 5' primary accessible boarding location must be marked on the platform where the primary accessible vehicle door is expected to stop. (On the design vehicle, the second door from the front is assumed to be the primary accessible door.) A secondary accessible boarding location may be necessary on certain vehicles where in-vehicle barriers exist due to the vehicle's articulation. Accessible boarding locations must be marked in accordance with SEPTA standards, and kept free of obstructions.

Platform ramp: An accessible ramp to platform height must be provided at all stations. The ramp should be located at the end of the platform closest to a sidewalk and pedestrian-safe intersection. An additional ramp may be located at the opposite end of the platform, so long as it provides access to a sidewalk.

Platform Dimensions:

Dimension	Minimum	Preferred
Platform width	8' - 6"	12'
Platform length*	80'	100'
Platform height	10"	14" †

* "Platform length" refers to the length of the platform at full height. It does not include the platform ramp.

† Level boarding, with a platform that is nominally 14" above top-of-rail, provides the best passenger boarding experience, but presents other challenges (see pg. 27 "Level Boarding.")

To ensure consistency in passenger experience and minimize tripping hazards, level boarding must be considered on a systemwide basis. It is not advisable to construct level-boarding platforms at one station unless they are constructed at all off-street stations along a route.

Level boarding may also present problems during early Trolley Modernization phases, when old and new vehicles share stations. (See p. 27, "Existing Boarding Height").

Platform Height:

Modern light rail systems achieve accessibility by providing a raised boarding platform to interface with a low-floor vehicle.

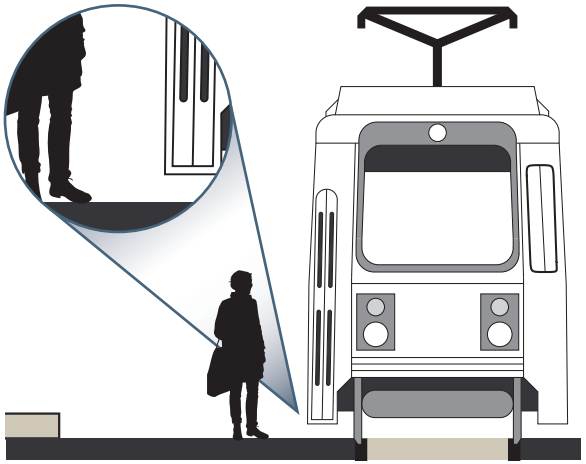


Figure 44 | Existing boarding height

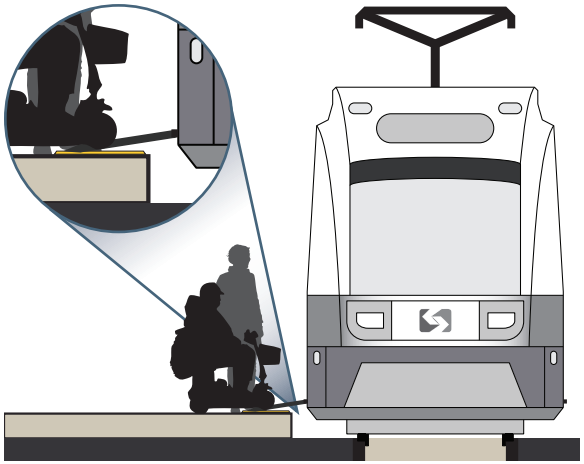


Figure 45 | Near-level boarding

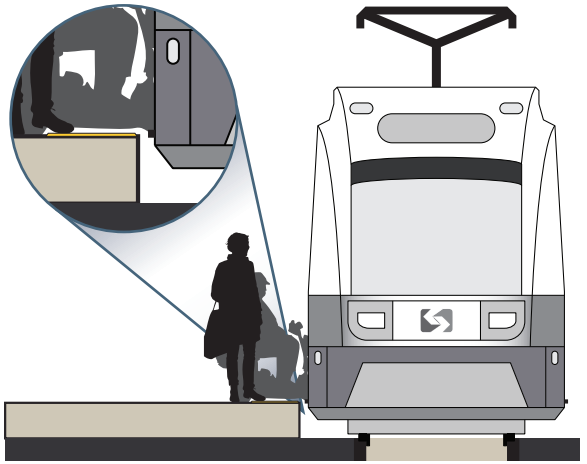


Figure 46 | Level boarding

Existing Boarding Height:

As noted throughout this report, existing trolleys on routes 101 and 102 do not offer accessible boarding. To board, passengers must step up into the vehicle, then up a set of three stairs. The interior floor height of existing trolleys is 36".

At stations with platforms, the step from the platform into the vehicle is not as severe as from street level, but passengers must still climb two more stairs to reach the interior vehicle floor.

The bottom stair on existing vehicles is 11" above top-of-rail (TOR). Without a retrofit, this would prevent existing vehicles from sharing a 14"-high level boarding platform designed for new vehicles, as it would force passengers to step down to board older vehicles.

Near-level Boarding:

Stations with near-level boarding feature a raised platform that is higher than a typical 6"-high sidewalk curb, but lower than a modern vehicle's 14"-high floor—they vary across U.S. transit systems from 8–10" above TOR. To comply with the ADA, these platforms require a vehicle-borne bridgeplate ramp, which passengers can activate using a button on the outside of the vehicle. Bridgeplates typically take 10-15 seconds to deploy, and 10 seconds to retract.

Near-level platforms are easier to integrate into a streetscape than level platforms. They require less ramp-up space from sidewalk height. Near-level platforms also allow interoperability with buses, which typically cannot always open their doors or deploy their wheelchair lifts at fully level platforms. This flexibility means near-level platforms are almost universally preferred in mixed-traffic conditions.

Level Boarding:

Level boarding platforms are meant to be approximately the same height as the trolley's door thresholds—14" above TOR. ADA requirements for level boarding are generally stricter than those for near-level boarding, requiring a 3"-maximum platform/vehicle gap, and 5/8"-maximum difference in platform/vehicle floor height.

Level boarding requires no bridgeplates, and provides the best boarding experience for passengers. On the other hand, it requires more space to ramp up to platform height, a much higher-than-typical curb for in-street stops, and limits flexibility in station design.

Practically, level boarding is only constructible at stations in exclusive right-of-way. Passenger experience consistency is critical when deciding between boarding heights. SEPTA should not offer level boarding unless it can do so at all off-street stations, and can safely alert passengers to lower platforms at on-street stations.

OFF-STREET STATION

Off-Street Station

This station is applicable at stations in trolley-exclusive rights-of-way. Dedicated rights-of-way minimize conflicts with other vehicles, improving service reliability and speed. These recommendations are intended to help SEPTA maximize the benefits of trolley-only rights-of-way while ensuring ADA compliance and compatibility with modern vehicles.

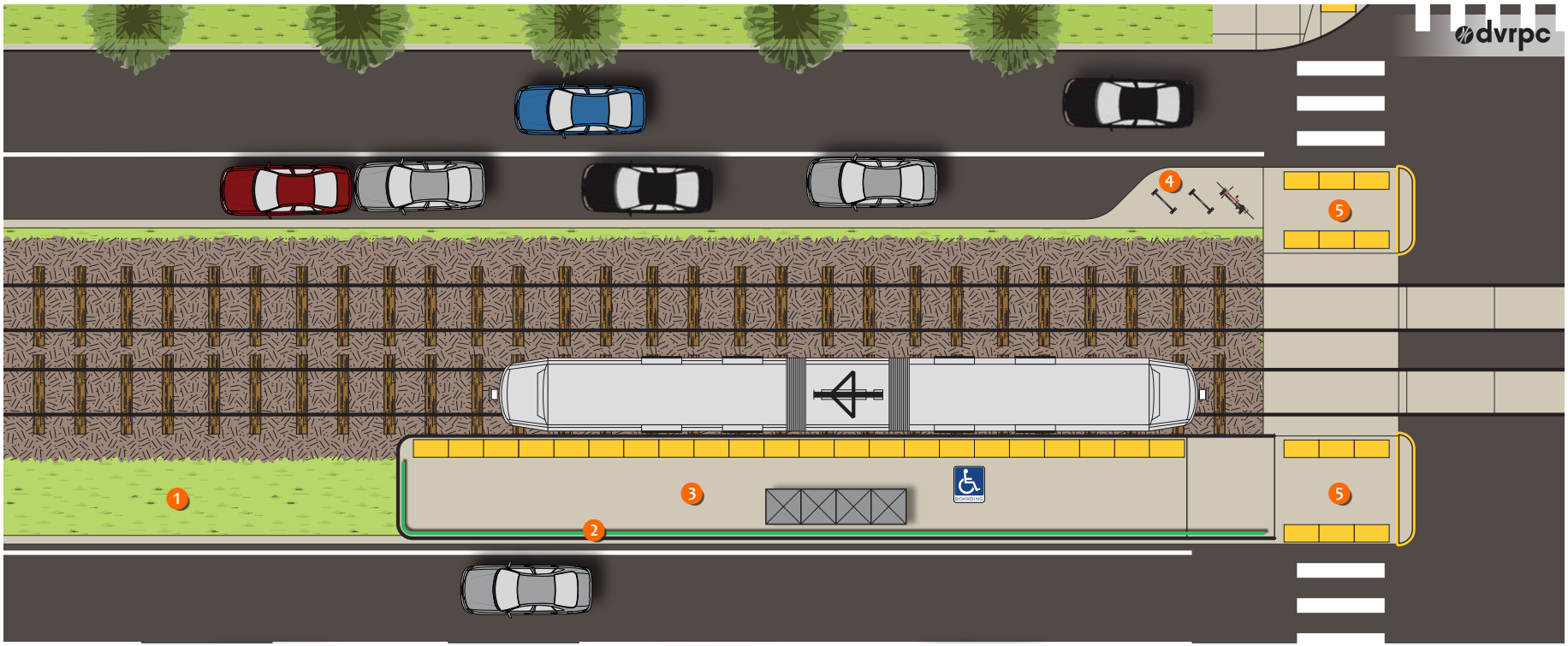


Figure 47 | Off-street Station: Plan

Design Recommendations:

1. Consider replacing standard railroad ballast in the trolley right-of-way with grass, decorative pavers, or other materials that enhance the public realm, and where applicable, to manage stormwater.

2. When stations are adjacent to vehicular traffic, use a barrier or railing to protect passengers. Locate the barrier at least 1 foot from the outside platform edge so passengers cannot easily lean into the travel lane.

3. The platform must be large enough to accommodate anticipated peak-period waiting passengers at Queuing Area Level of Service C (Platform LOS C) (*Highway Capacity Manual*, Exhibit 4-1) or better. If platform width is constrained, the platform may be enlarged lengthwise to achieve Platform LOS C.

4. Where space allows, incorporate bicycle parking into stations. Bicycle parking should take advantage of existing shelters, if possible, or should otherwise be covered from the elements when demand dictates. (See SEPTA's *Media Sharon Hill Lines: Bicycle Access and Parking Analysis*, October 2015 for station-specific guidance.) Like all station furnishings, bicycle parking must not impede an accessible route.

5. Include a pedestrian refuge island where the crosswalk meets the trolley right-of-way. Refuge islands must include detectable warning strips at either end, and a raised curb at the intersection to protect pedestrians from turning vehicles.

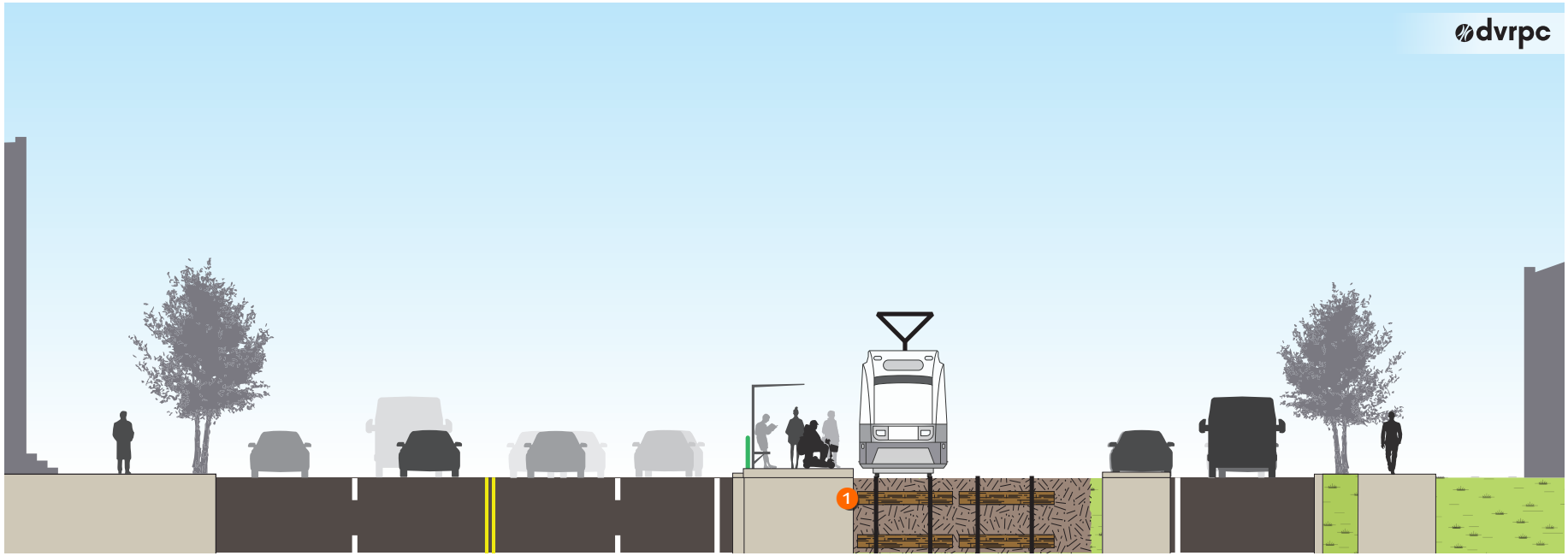


Figure 48 | Off-street Station: Section

Design Recommendations:

1. In areas of exclusive trolley right-of-way, consider building platforms to allow level boarding—nominally 14 inches above top-of-rail.

   To ensure consistency in passenger experience, and to minimize tripping hazards, level boarding must be considered on a routewide basis. Do not construct level-boarding platforms at one station unless they are constructed at all off-street stations along a route.

Key Design Dimensions:

Dimension	Minimum	Preferred
Platform width	8' - 6"	12'
Platform length	80'	100'
Platform height	10"	14"

Variation: single track

The same recommendations for double-track stations apply to stations on single-track right-of-way, including platform dimensions and accessible route guidance.

At stations where the platform is not immediately adjacent to a roadway, do not use railings unless required by ADA guidelines (such as on a ramp with a rise of more than 6"), or unless the railing eliminates a safety hazard.

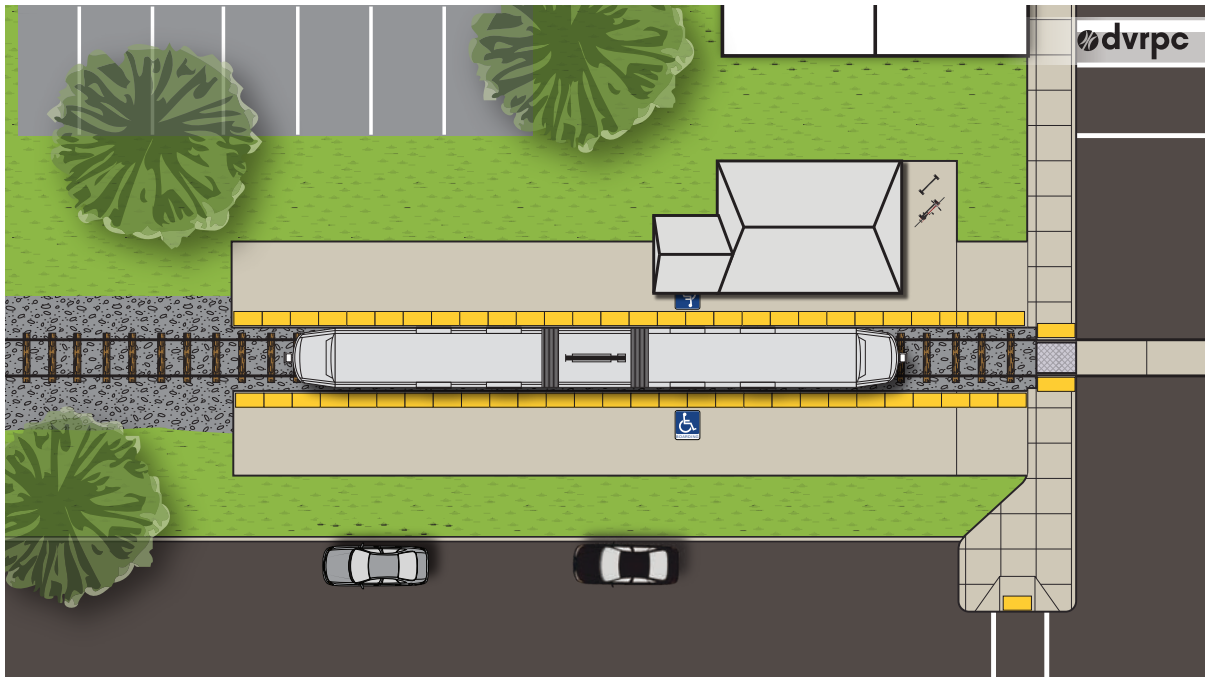


Figure 49 | Off-street Station: Single-track variation

Focus Area: Aldan Borough

Route 102 includes a 3/4-mile segment that operates on public streets in mixed traffic. Modern stations on this segment must meet the same accessibility standards as stations in an exclusive right-of-way. The strategy for meeting those standards, however, must be adapted to an on-street context.

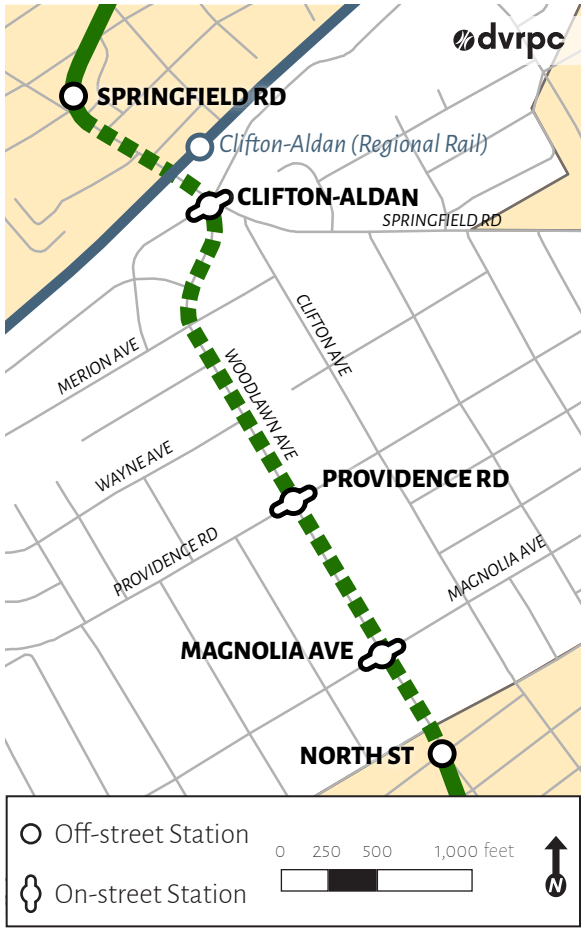


Figure 50 | Aldan Borough focus area map

Outbound, Route 102 leaves its dedicated right-of-way after the Springfield Road station, in Clifton Heights Borough. Trolleys travel on Springfield Road through Aldan Borough, reentering an exclusive right-of-way at North Street.

In order to achieve ADA compliance, SEPTA must build curb extensions that bring a platform towards the vehicle's doors, even in on-street conditions. The station type presented in this focus area, the Curb Extension Station, is meant to address this challenge. On-street stations present new challenges, as they share the right-of-way with other users. Curb Extension Stations would remove approximately 2–3 on-street parking spaces per platform.

Station design is not the only challenge to providing modern trolley service in the Aldan Focus Area. As noted in Chapter 3: Design Assumptions, SEPTA must pursue a stop consolidation strategy to ensure effective implementation of Trolley Modernization. In deciding which stations it is feasible to modernize, SEPTA will weigh several factors, including CONSTRUCTIBILITY, RIDERSHIP, the surrounding transportation NETWORK, and STATION SPACING. (See pp. 22–23.)

These factors present several challenges in the Aldan Focus Area. Both the Clifton-Aldan and Springfield Road (just outside the focus area) stops are on tight curves that may not accommodate a modern trolley station. Magnolia Avenue, on the other hand, has few constructibility challenges, but very low ridership and fewer transportation network connections.

In discussions with the project team, Aldan Borough officials identified Providence Road as a priority stop because it has comparatively high ridership, minimizes impacts to neighbors, and is geographically central to the route. Using this report as guidance, SEPTA will work collaboratively with Aldan, Clifton Heights, and Delaware County officials to site modern stations appropriately.

Figure 51 | Providence Road, inbound stop

Figure 52 | Clifton-Aldan, inbound stop

Curb Extension Station

This station type is applicable at stations in mixed traffic on two-lane, two direction streets with on-street parking. Curb extensions not only provide an accessible trolley station, but can also improve pedestrian safety by narrowing the roadway, and making pedestrians more visible to drivers. Curb extensions also offer space for street furniture and other public amenities.

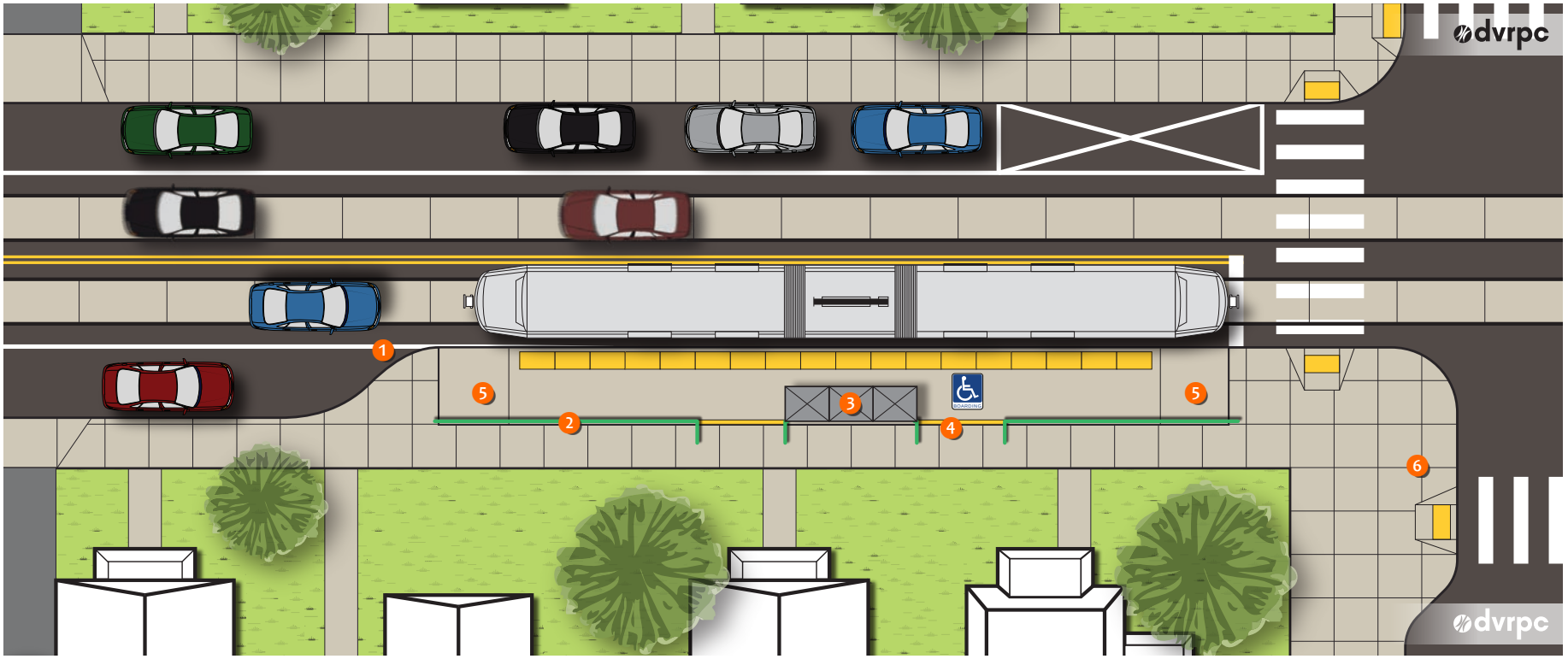


Figure 53 | Curb Extension Station: Plan

Design Recommendations:

1. Use a white lane marking to indicate areas where the travel lane narrows for a station platform. Additional treatments, such as painting the curb edge a bright color, or placing reflectors on the curb edge, may prevent drivers from hitting the station.
2. Consider using railing to delineate the platform from the adjacent sidewalk.
3. Include a passenger shelter that meets SEPTA's standards for passenger comfort as articulated in DVRPC's *SEPTA Bus Stop Design Guidelines*, p. 33 (https://www.dvrpc.org/Products/12025/). Shelters may not encroach upon ADA-required clear areas.
4. Consider adding a step to create additional, non-accessible platform entrances at the rear edge of the platform. This step, and any associated handrail, must comply with *ADA Standards for Transportation Facilities* § 504–505.
5. The preferred location for the platform ramp is closest to the intersection, but whenever space allows, include a ramp at both ends of the platform.
6. Where space allows, continue the curb extension onto cross streets to further improve pedestrian safety.

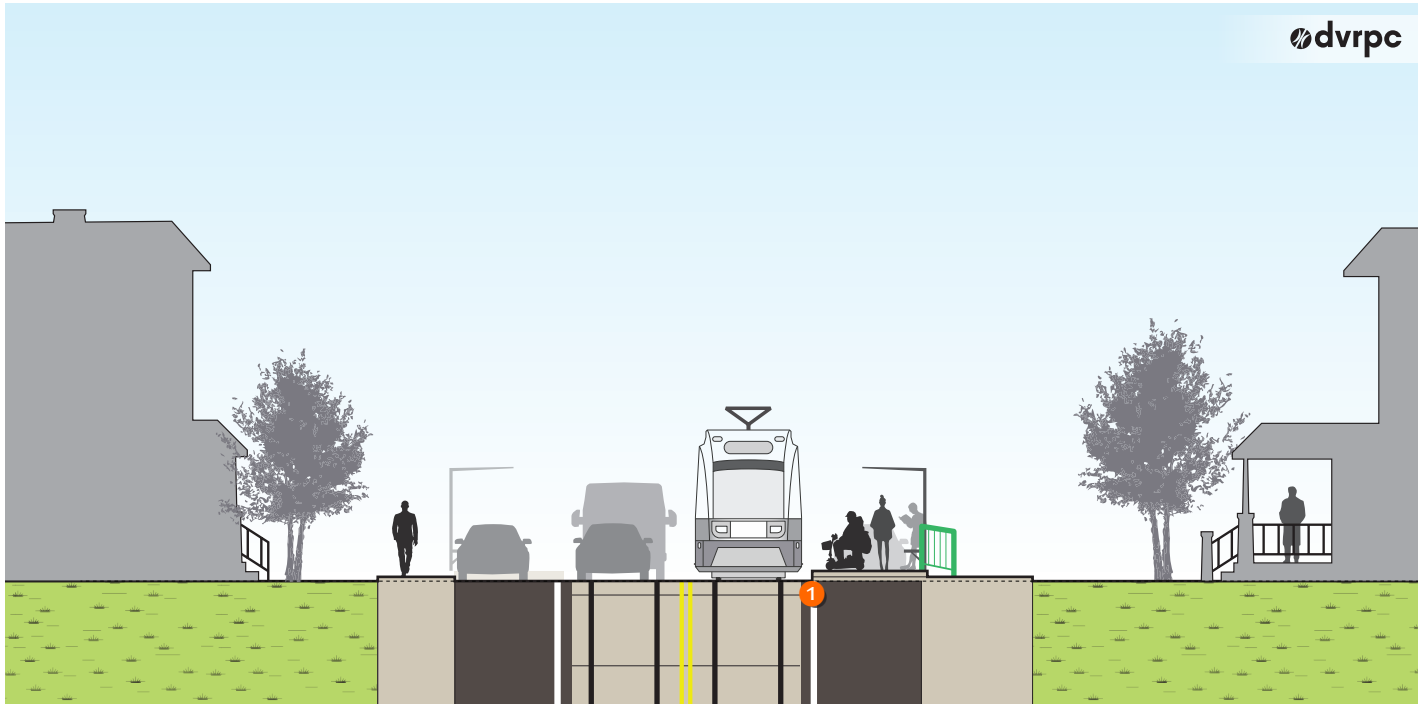


Figure 54 | Curb Extension Station: Section

Design Recommendations:

1. At stations in mixed traffic, design platforms for near-level boarding only.

Key Design Dimensions:

Dimension	Minimum	Preferred
Platform width	8' - 6"	12'
Platform length	80'	100'
Platform height	10"	10"

Variation: Far Side

A curb extension may be located on the far side of an intersection if necessary and safe. The platform should be located far enough from the intersection that a stopped trolley does not block the crosswalk.

Far-side stations have some drawbacks that should be noted before design. Far-side stations can encourage mid-block pedestrian crossings because they must be set farther from the intersection than a near-side station.

Unless the street's signals are coordinated for transit signal priority (TSP), far-side stations may force trolleys to stop twice, once for a red light, then again at the station, which creates delay. They can also encourage queuing behind the vehicle into the intersection, either by through-traffic, or by traffic turning from an intersecting street.

At certain station locations where a far-side stop is the only option—for instance, due to constructibility constraints—designers should take care to mitigate these drawbacks.

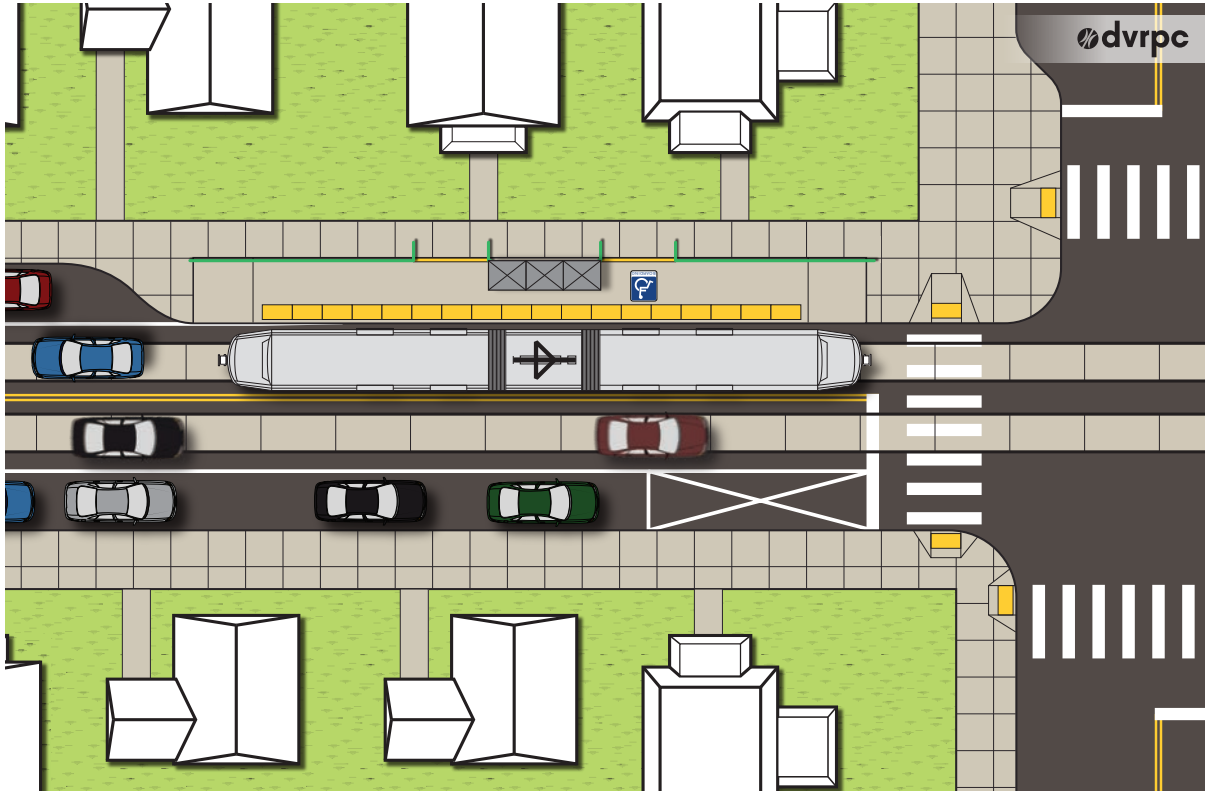


Figure 55 | Curb Extension Station: Far-side variation

Focus Area: Media

Most of routes 101 and 102 operate in a relatively conventional light rail right-of-way. The 2/3-mile segment of Route 101 between Providence Road and Orange Street, on the other hand, is highly unconventional, and demands a special design focus.

Trolleys operate on a single track in the center of State Street, Media's vibrant downtown commercial spine. With in-street trolley tracks, traffic in both directions, and two parking lanes, travel on State Street is a chaotic, often congested experience (see Figure 57).

Yet, the short portion of Route 101 in Media Borough accounts for more than 25 percent of the route's ridership. Trolley service is indispensable to Media residents and visitors, and Media's ridership base is essential to SEPTA.

State Street's unique configuration makes designing safe, effective, ADA-compliant stations difficult. This report provides a range of design options, along with a description of each station type's impacts on State Street. These station designs respond to several potential constraints, including track configuration and on-street parking needs. In the broadest sense, each station type is technically feasible, but each has benefits and drawbacks. Depending on how new stations are designed and implemented, Trolley Modernization could either exacerbate or alleviate State Street's undesirable traffic situation.

The "streetscape impacts" presented with each station design are intended to help decisionmakers compare the effects of each station type across several factors, such as traffic or parking. Each station design will have distinct impacts on State Street. This report illuminates those impacts, but

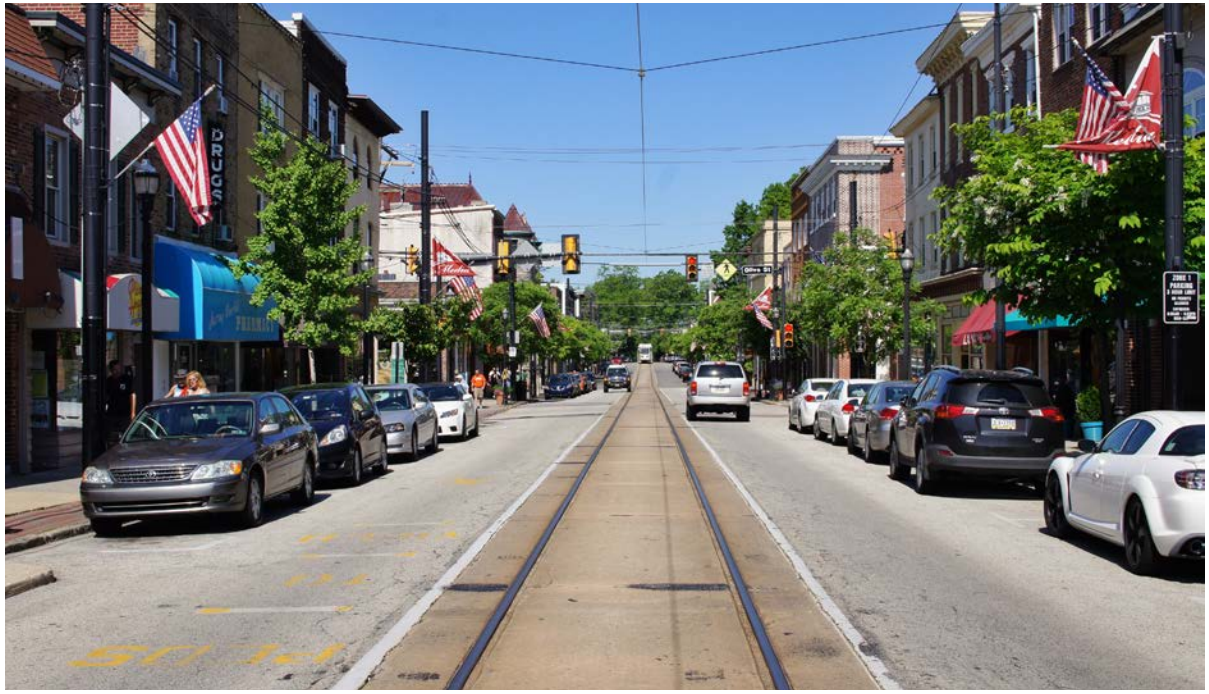


Figure 56 | State Street looking west from Plum Street pedestrian mall

Figure 57 | State Street looking west from Providence Road

The above image depicts a common experience on State Street. The trolley, moving towards the photographer, must wait for multiple cars to reverse and clear the way. The cars are unable to pass between the parked cars and the trolley, but their drivers had not realized it until it was too late to move.

does not prescribe which are most important. That decision must be made collaboratively between SEPTA, Media Borough, Delaware County, and Media residents. With this report's early analysis complete, SEPTA is beginning its outreach to county and municipal stakeholders, as well as the public at large.

The most basic distinction between this section's station types is whether a station type requires laying new trolley tracks. Moving, replacing, or adding new tracks is a major construction project that could make State Street inaccessible to cars for weeks at a time, but is a prerequisite for stations that could resolve State Street's traffic challenges.

The decision to change the track configuration on State Street would also rest on a wider set of engineering constraints, such as the ability to power multiple trolleys at once, available poles for catenary wire, and the lifespan of State Street's existing tracks[2].

[2] The existing tracks on State Street were last replaced in 1996. The expected useful life of in-street trolley tracks is approximately 25-30 years, meaning these tracks will be due for renewal at roughly the same time as Trolley Modernization is expected to begin implementation.

At this early stage, many constraints are uncertain, and as a result, this report prepares for both single- and double-tracked versions of State Street.

Track configuration also dictates how trolleys function at the end of the route. With double-ended trolleys, there are two options for the end of the line. One option, a stub-end terminal, is used today at Orange Street (see Figure 59). This option is relatively easy to construct, but requires traffic or parking controls while trolleys are stopped in-street.

Figure 58 | Media Borough focus area map

Figure 59 | State Street looking east from Orange Street stop

In this image, a trolley lays over at a stub-end terminal, just west of Orange Street. No parking zones on either side of the street allow cars to pass a stopped trolley.

The other end-of-line option is a loop track, a portion of track where trolleys can turn around. SEPTA uses loop tracks for its single-ended trolleys on its City Transit Division routes in Philadelphia (see Figure 60), and at 69th Street Transportation Center. A loop track is useful because it provides an off-street boarding and layover location. Its main drawback is that it requires much more space than a stub-end terminal. In order to construct a loop track, SEPTA would need to acquire off-street property near the end of Route 101, likely by assembling multiple parcels.

Figure 60 | Yeadon Loop, Yeadon, PA

Source: City of Philadelphia, 2015 Aerial Imagery

SEPTA's Yeadon Loop, on Route 13, is a typical trolley loop track. It occupies approximately 35,000 sq. ft., or 0.8 acres of off-street space.

The DVRPC project team presented these station concepts to Media Borough Council's Community Development Committee (CDC) on February 27, 2017, and on January 23, 2018. The CDC expressed a strong interest in the Curb Extension Station, because it would mostly preserve on-street parking, and rationalize traffic flow on State Street—an opinion shared by SEPTA staff members who participated in this design guide. A letter from Borough Council President Brian Hall to this effect is included in this document as Appendix B.

Nevertheless, the other five station design options are presented in this section as part of a menu of options for use in an upcoming, more inclusive public process. A strong public process will use this report's graphics and analysis as tools to explain the trade-offs that result from each station type.

Pages 38–49 present the station designs at a conceptual level of detail. Each design is shown in plan and cross-section views, along with specific design recommendations. As noted earlier, each station design includes a section on "streetscape impacts." This section is meant to help stakeholders compare station designs based on a series of factors, including track infrastructure, on-street parking, and traffic patterns.

Media Borough Station Designs:

A: Speed Table Station

This station type raises the roadway on either side of the trolley tracks so that passengers may board from the street. This station's purpose is to provide level or near-level trolley boarding with minimal impact to existing traffic patterns. This station type requires especially careful consideration of pedestrian safety.

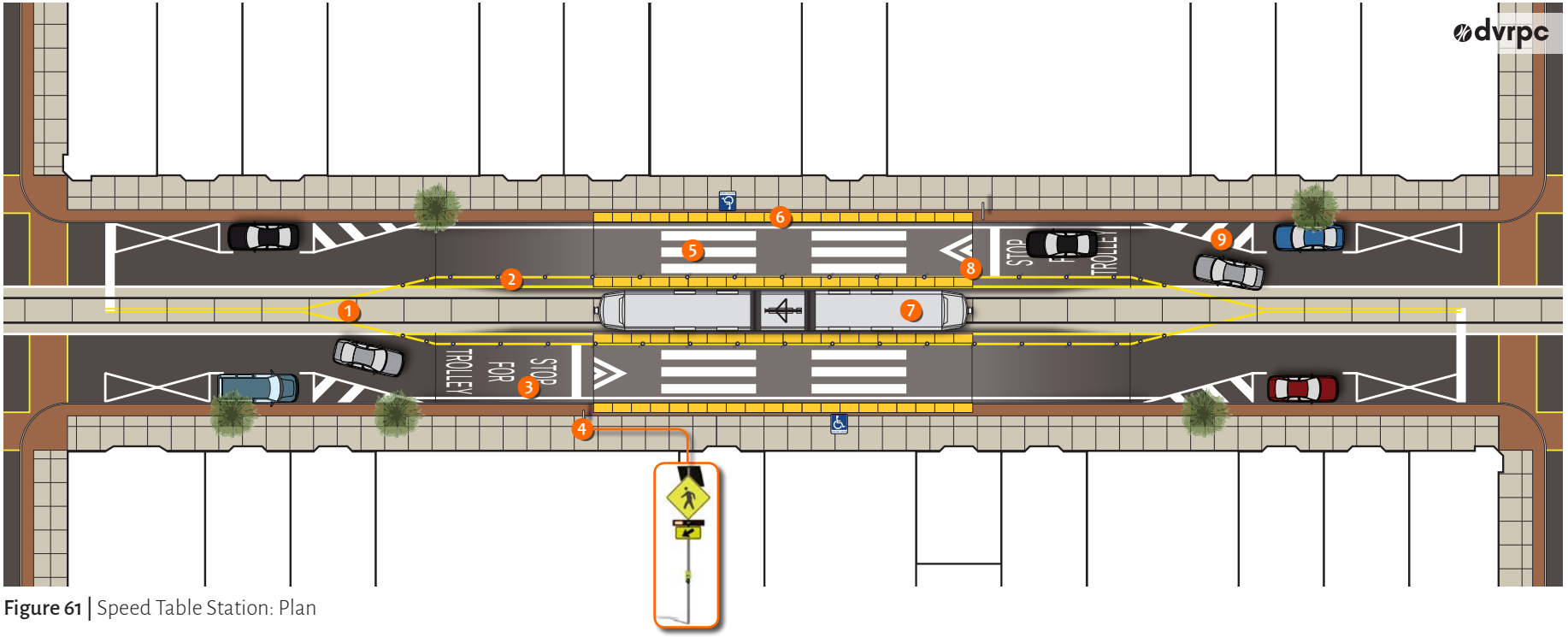


Figure 61 | Speed Table Station: Plan

Design Recommendations:

1. Shift travel lanes away from the trolley tracks using yellow center line markings. Yellow lines must be at least 2' from the raised curb edge of the speed table.
2. Use flexible plastic bollards to prevent drivers from driving out of the travel lane into the sunken trolley lane.
3. Alert drivers that they must stop when a trolley is at a station using a stop bar and "STOP FOR TROLLEY" pavement markings.
4. Direct drivers to stop for passengers as they board and alight the trolley using Rectangular Rapid Flashing Beacons (RRFBS) (MUTCD IA-11).
5. Locate crosswalks to guide passengers to trolley door sets at expected stop locations.
6. Install detectable warning strips along the sidewalk edge and along the raised curb edge of the speed table.
7. Train trolley operators to check visually for traffic before opening doors for alighting passengers.
8. Mark the raised speed table with white "v" shaped markings in accordance with MUTCD 3B-30.
9. Remove parking between either end of the lane transition.

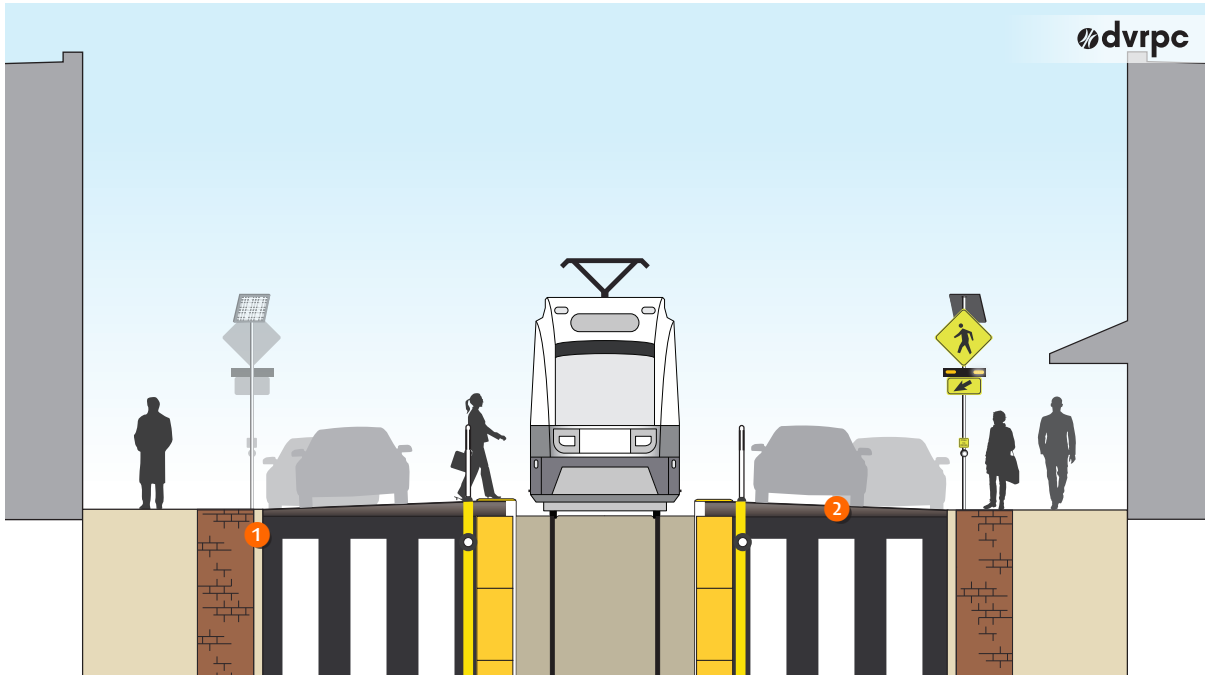


Figure 62 | Speed Table Station: Section

Design Recommendations:

1. The sidewalk curb edge should be flush with the roadway. This may require special stormwater features for the length of the station.

2. The roadway should slope upwards from curb height at the sidewalk to 10" at the edge of the trolley boarding location.

End-of-Line Treatment:

This station type can function as an end-of-line layover location.

Streetscape Impacts:

Track:

No new track is needed for a Speed Table Station.

Traffic:

State Street's existing traffic challenges would be preserved. Vehicles would be required to stop mid-block when trolleys stop to load or unload passengers.

Parking:

This concept would require removing approximately 18–20 parking spaces per two-direction station. The parking lane would remain 6' - 6" wide.

Pedestrian:

This station design presents important pedestrian safety concerns, as passengers board or alight into a travel lane mid-block. Recommendations 3–7 on p. 38 are meant to mitigate this risk.

Construction:

Construction impacts would be limited to station locations, but traffic flow could most likely not be preserved during construction.

Peer Practice:

Staff from VicRoads, the transportation authority for the state of Victoria, Australia, have conducted an extensive before-and-after research analysis of a similar station type on a four-lane, arterial road in Melbourne. Their findings showed no negative impact to pedestrian safety or roadway capacity as a result of the new stations.[3]

[3] Pauwels, Brendan and Say, Alec. "Easy Access Tram Stops on Bridge Road, Richmond" (paper presented at Australian Institute of Traffic Planning and Management National Conference, Adelaide, South Australia, Australia. August 13-14 2014) https://trid.trb.org/view.aspx?id=1326843

B: Track Siding Station

This stop type adds a curbside platform, and uses additional track to shift the trolley from its existing center alignment towards the sidewalk. A Track Siding Station is most appropriate if stakeholders' top priority is preserving the center-running trolley alignment on State Street, and minimizing temporary construction impacts.

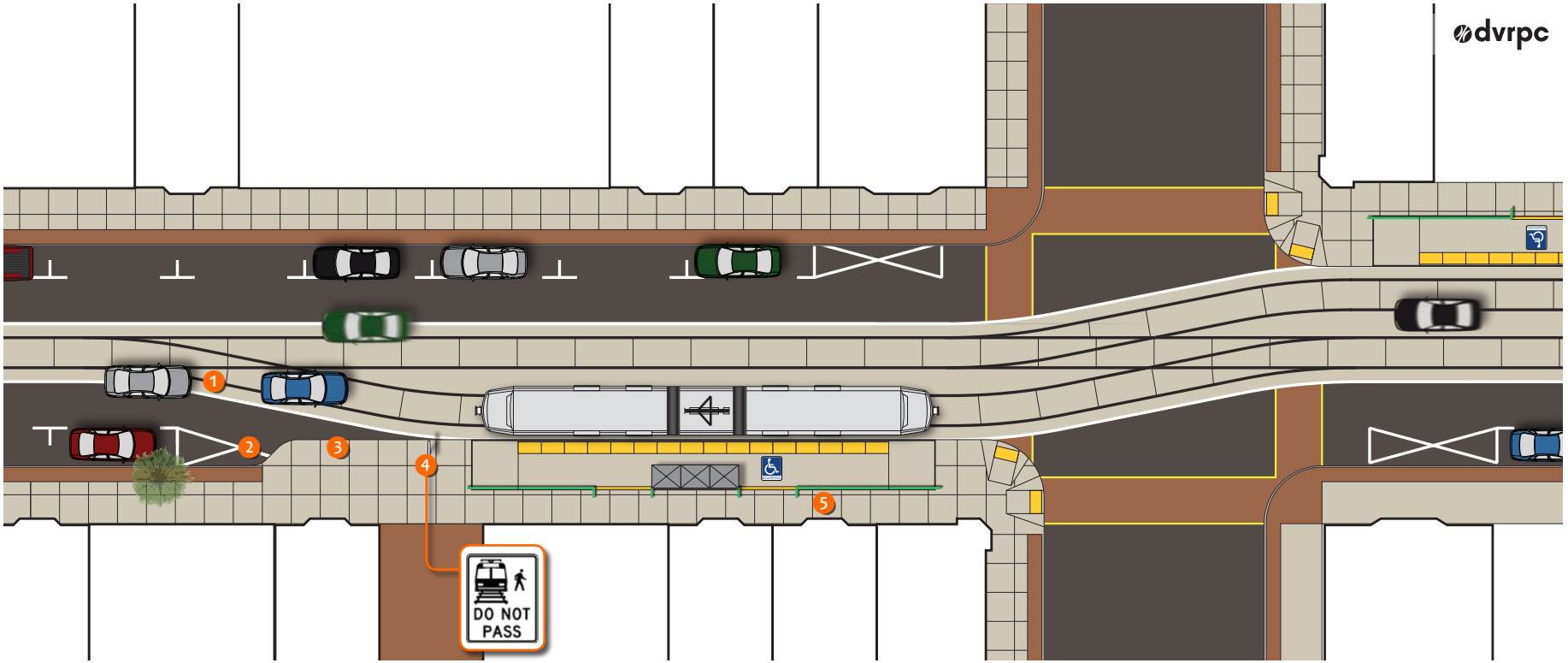


Figure 63 | Track Siding Station: Plan

Design Recommendations:

1. Use a track siding to bring the trolley towards the curb. The trolley should transition only into the direction of traffic in which it is moving, not into oncoming traffic.
2. Prohibit parking within the trolley's transition zone. Allow at least 2' of clearance between parked cars and the trolley as it transitions onto the siding track.
3. Extend the curb towards the siding track. The curb edge should be no more than 6" from the edge of the vehicle door. On State Street, this would typically require a curb extension of between 3' and 3' - 6". In addition to bringing the platform edge towards the vehicle, this narrow curb extension prevents cars from parking where they would block the trolley.
4. Place a "Light Rail Do Not Pass" sign (MUTCD R15-5) immediately before the boarding area to discourage drivers from passing a stopped trolley.
5. Maintain at least 5' of clear sidewalk space behind the station platform to ensure pedestrian movement.

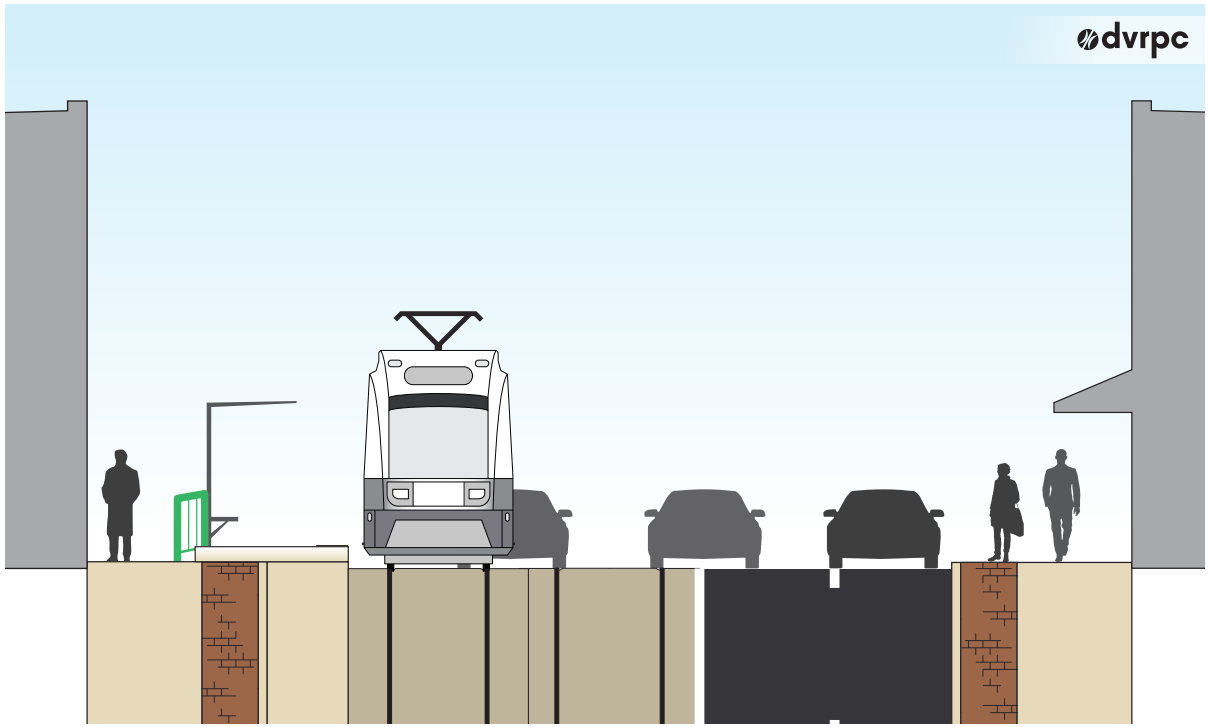


Figure 64 | Track Siding Station: Section

End-of-Line Treatment:

This station type's center-running track configuration allows trolleys to lay over in-street at a mid-block location, provided on-street parking is controlled. This is an existing condition at Orange Street.

A station platform would not be possible at this layover location because it would block traffic flow in one direction.

Streetscape Impacts:

Track:
New track is required adjacent to each station, plus switches to tie into the existing, center-running track on State Street. This station concept could be implemented without disturbing areas of existing track that are not immediately adjacent to a station.

SEPTA Track Division staff reports that, counterintuitively, track work for this station is likely to be more costly than simply laying two new tracks. Though this station type would require much less track than a double-track station, each special siding track and associated switch would be expensive enough that 4-5 stations would cost as much as two new straight tracks.

Traffic:
State Street's existing traffic challenges would remain, with small exceptions. Trolleys must come to a complete stop before switching tracks, causing more congestion, but when trolleys are stopped at stations, oncoming traffic could flow more freely. The track switches may confuse drivers.

Parking:
This concept would require removing approximately 5 parking spaces per station in each direction. The parking lane would remain 6' - 6" wide, and the parking spaces nearest to stations would need to be closely monitored so that they would not block the trolley.

Pedestrian:
The State Street pedestrian environment would remain mostly unchanged, except at stations, where the sidewalk would be slightly narrowed.

Construction:
Construction impacts would affect station locations and nearby intersections. With appropriate phasing, traffic flow could likely be preserved during construction.

C: Curb Extension Station

This station type, also recommended in the Aldan focus area, is the most straightforward and most peer-tested of the Media station options. Passengers board from a raised platform occupying the parking lane at each station location. Though this station type requires significant construction impacts, it offers significant long-term benefits compared to the other station options, including a solution to State Street traffic congestion, and partially enabling more frequent trolley service (if paired with double-tracking farther along the route.)

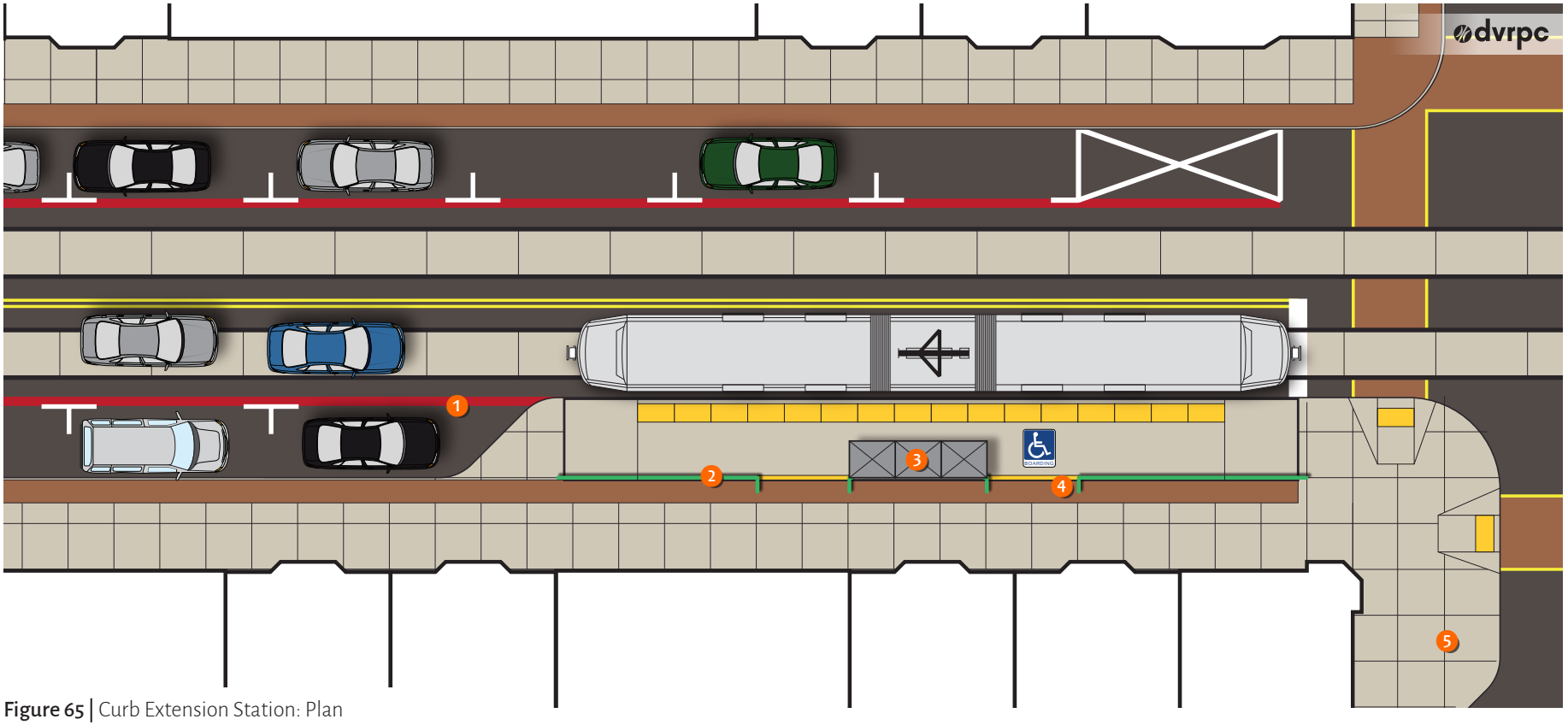


Figure 65 | Curb Extension Station: Plan

Design Recommendations:

1. Use red paint to identify the outer edge of the trolley's clearance envelope. Consider accompanying signage directing drivers to park within designated spaces so that they do not block the trolley. (See *https://www.dcstreetcar.com/safety/motorists/* for a peer practice example of driver education on safely parking outside of a streetcar's clearance envelope.)
2. Consider using railing to delineate the platform from the adjacent sidewalk.
3. Include a passenger shelter that meets SEPTA's standards for passenger comfort. Shelters may not encroach upon ADA-required clear areas.
4. Consider adding a step to create additional, non-accessible platform entrances at the rear edge of the platform. This step, and associated handrail, must comply with *ADA Standards for Transportation Facilities* § 504–505.
5. Where space allows, continue the curb extension onto cross streets to improve pedestrian safety.

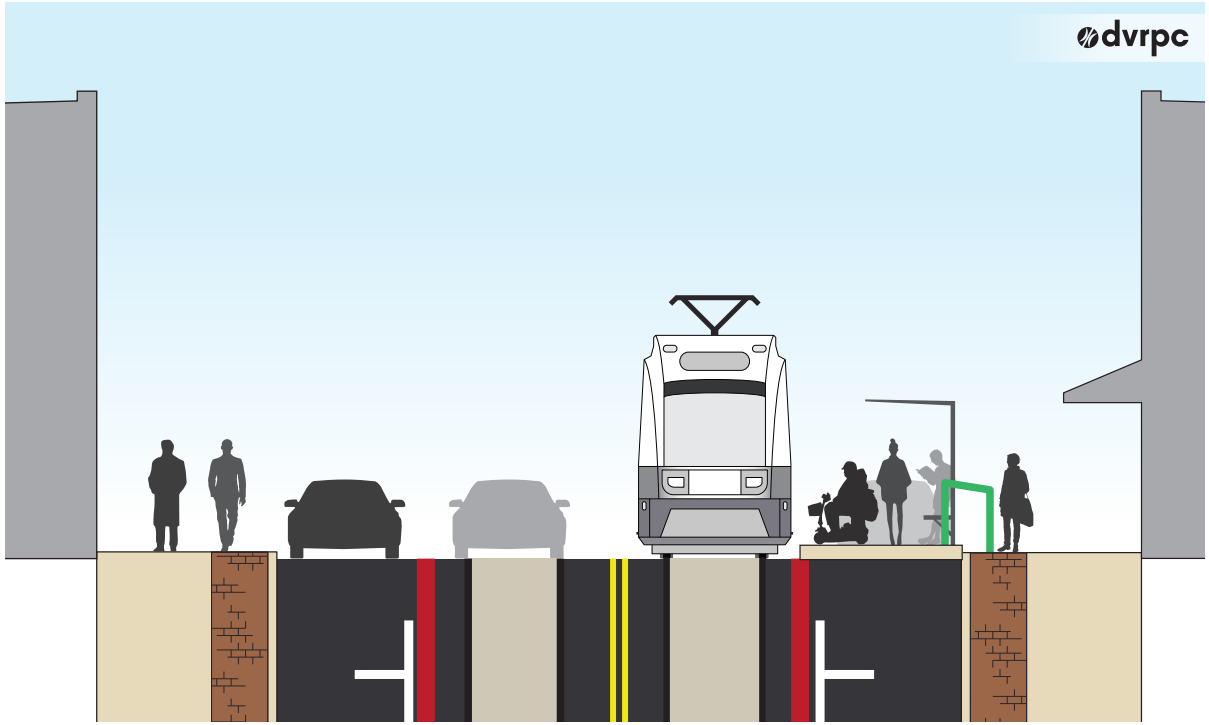


Figure 66 | Curb Extension Station: Section

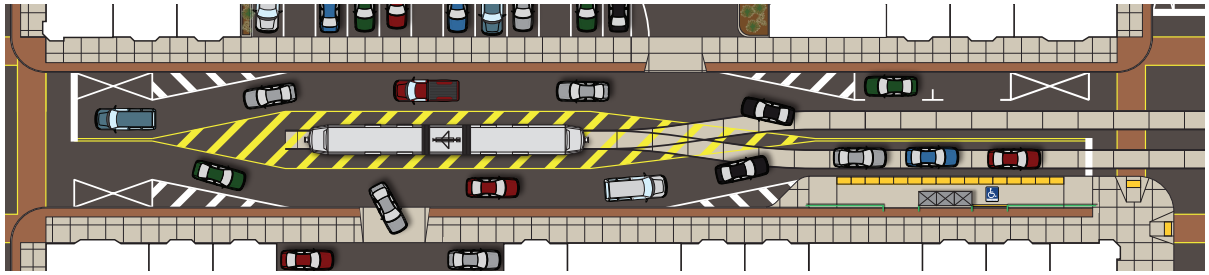


Figure 67 | Curb Extension Station: End-of-line

Streetscape Impacts:

Track:
All existing track on State Street would be removed and replaced with two sets of track.

Traffic:
State Street would become more predictable, with clearly delineated space for vehicular traffic. Without a center-running trolley, vehicles would not get stuck between an oncoming trolley and the parking lane.

Parking:
Each platform would require removing 2–3 spaces of on-street parking from State Street. On-street parking lanes would be widened by 1' - 6" to 8'.

Pedestrian:
Sidewalks would remain 10' wide on State Street. Riders would have more waiting space, and curb extensions (recommendation 5) would improve pedestrian safety.

Construction:
State Street would be inaccessible to cars on blocks where new tracks were being installed. During past track renewal projects, SEPTA has closed streets 2-3 blocks at a time, and replaced track at a rate of about 1 week per 500 feet of two-directional track. State Street features 3,600 feet of trolley track, suggesting a 6–8 week construction period.

End-of-Line Treatment:

In a double-track configuration, trolleys need either a loop track, or a Y-shaped switch that allows them to lay over without blocking a travel lane (see Figure 67). With downtown space in limited supply, the switch may be the only end-of-line option. A switch would occupy a similar footprint as the existing terminus west of Orange Street. An ADA-compliant curb extension could not be built at this layover location without blocking traffic flow, but could be built at the nearest intersection.

D: One-way Street - Curbside Station

In this scenario, State Street is reconfigured as a one-way street with two lanes of street parking, and a curbside, exclusive trolley right-of-way. This concept preserves all of State Street's existing curb parking, but sacrifices the ability to travel in both directions.

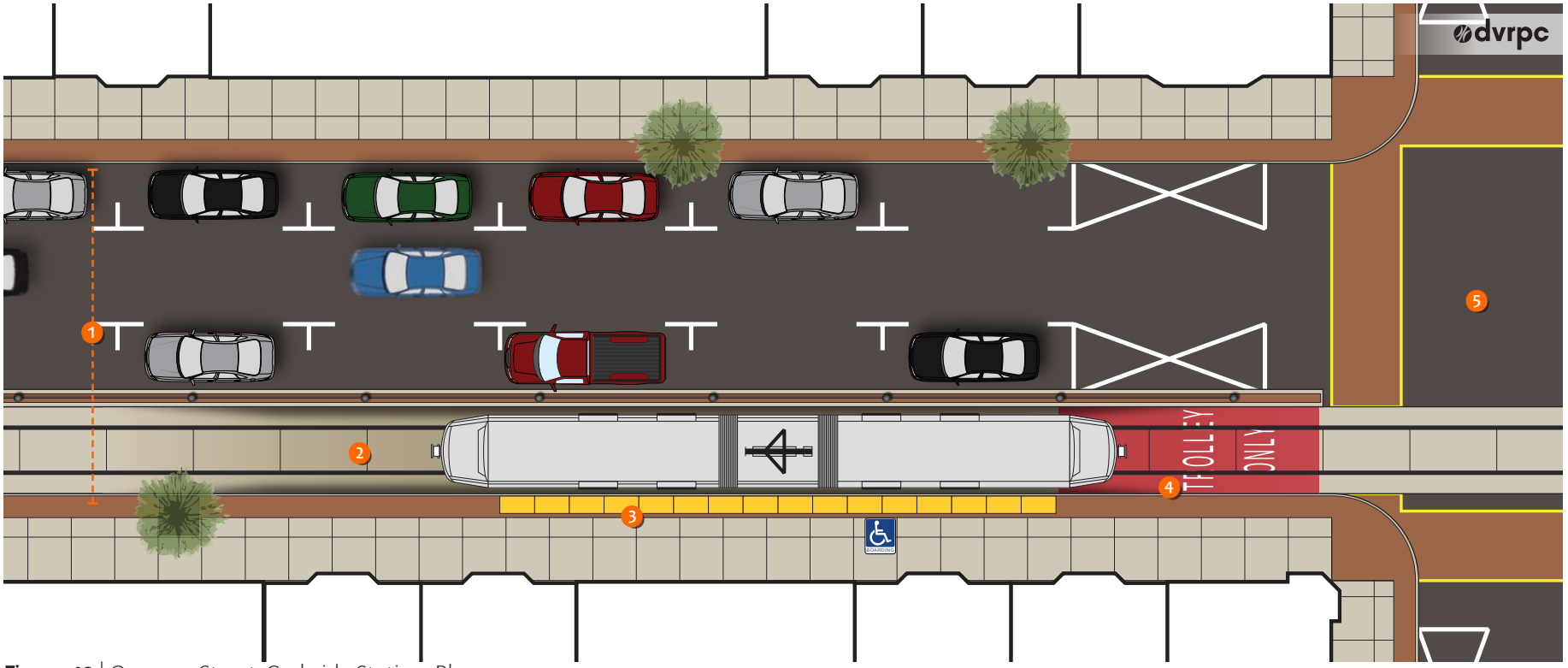


Figure 68 | One-way Street: Curbside Station: Plan

Design Recommendations:

1. Reconfigure State Street as a one-way street with two parking lanes, one travel lane, and a curb-separated trolley right-of-way. See Figure 69, page 45 for recommended lane measurements.

2. The trolley right-of-way should slope downwards as it approaches the trolley station. This allows near-level boarding directly from the existing sidewalk curb. Top-of-rail at the lowest part of the slope should be 10" below sidewalk height. (State Street's existing curb is 4–6" above the roadway, meaning the trolley right-of-way should slope downwards, 4–6" lower than the existing roadway.)

3. Passengers board a One-way Street Station directly from the sidewalk edge. Use detectable warning strips along the boarding location. The boarding area must be kept clear of obstructions.

4. To prevent drivers from entering, mark the trolley right-of-way with red paint and "TROLLEY ONLY" pavement markings at intersections.

5. Use a leading trolley signal phase and "No Turn on Red" signs to restrict turning movements, mitigating conflicts between turning traffic and trolleys.

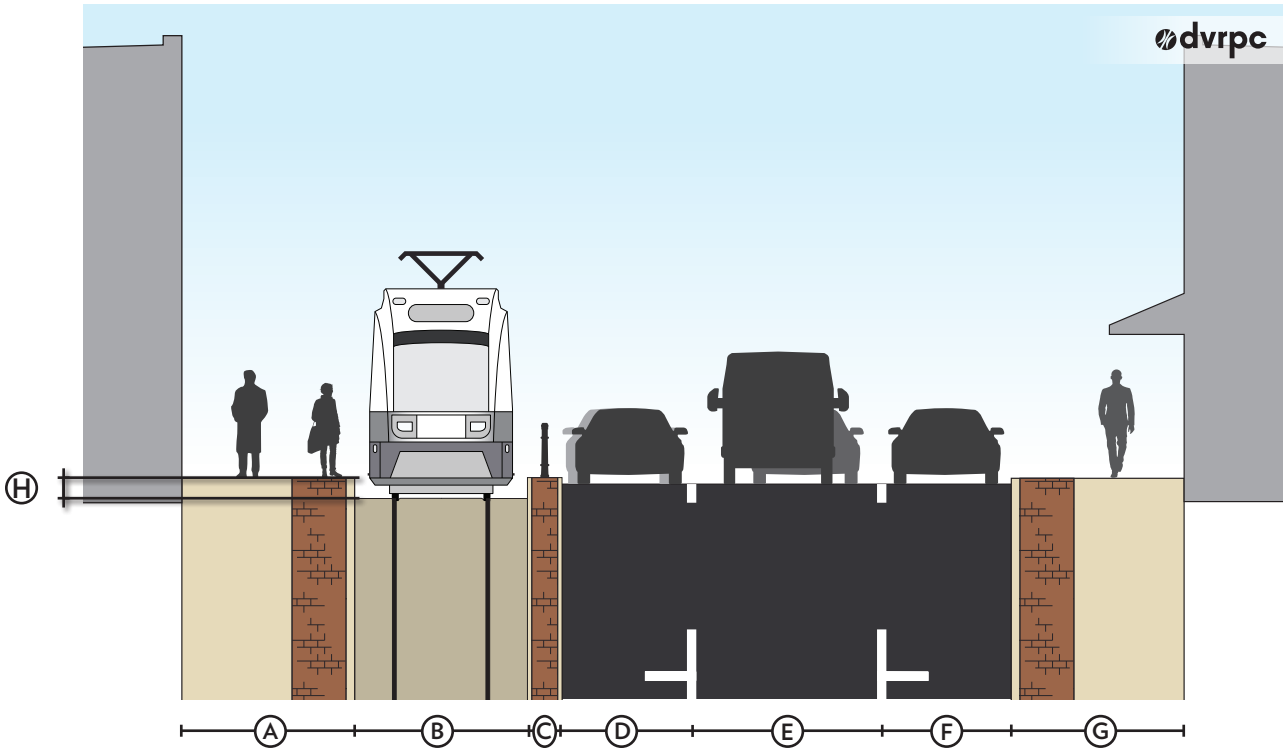


Figure 69 | One-way Street: Curbside Station: Section

Dimension		Width
A	Sidewalk (existing)	10' - 0"
B	Trolley right-of-way	10' - 0"
C	Curb buffer	2' - 0"
D	Parking lane	7' - 6"

Dimension		Width
E	Travel lane	11' - 0"
F	Parking lane	7' - 6"
G	Sidewalk (existing)	10' - 0"
H	Curb height (at station)	10"

Streetscape Impacts:

Track:
This concept requires eliminating all of State Street's existing track, and laying one new set of tracks.

Traffic:
Existing traffic conflicts on State Street would be alleviated, but traffic would only be able to travel in one direction. A traffic study should be conducted before making State Street one-way.

Parking:
This concept preserves all existing parking on State Street. Parking lanes would be widened by one foot compared to existing conditions. Auto passengers in the trolley-side parking lane would be constrained as they exit their vehicles.

Pedestrian:
State Street's pedestrian environment would be mostly the same, but people exiting parked cars on the trolley right-of-way side of the street would need to cross the street mid-block to reach a sidewalk.

Construction:
State Street would be inaccessible to cars during most of construction. Appropriate phasing could allow the vehicular section of State Street to reopen before work is complete on the trolley right-of-way.

End-of-Line Treatment:

This station type's trolley right-of-way can function as an end-of-line layover location with a curbside platform.

E: Two-way Street - Curbside Station

In this scenario, State Street is reconfigured as a two-way street with one on-street parking lane. Trolleys run in their own lane adjacent to an auto travel lane. This concept preserves two-way traffic on State Street, but removes half of the existing on-street parking.

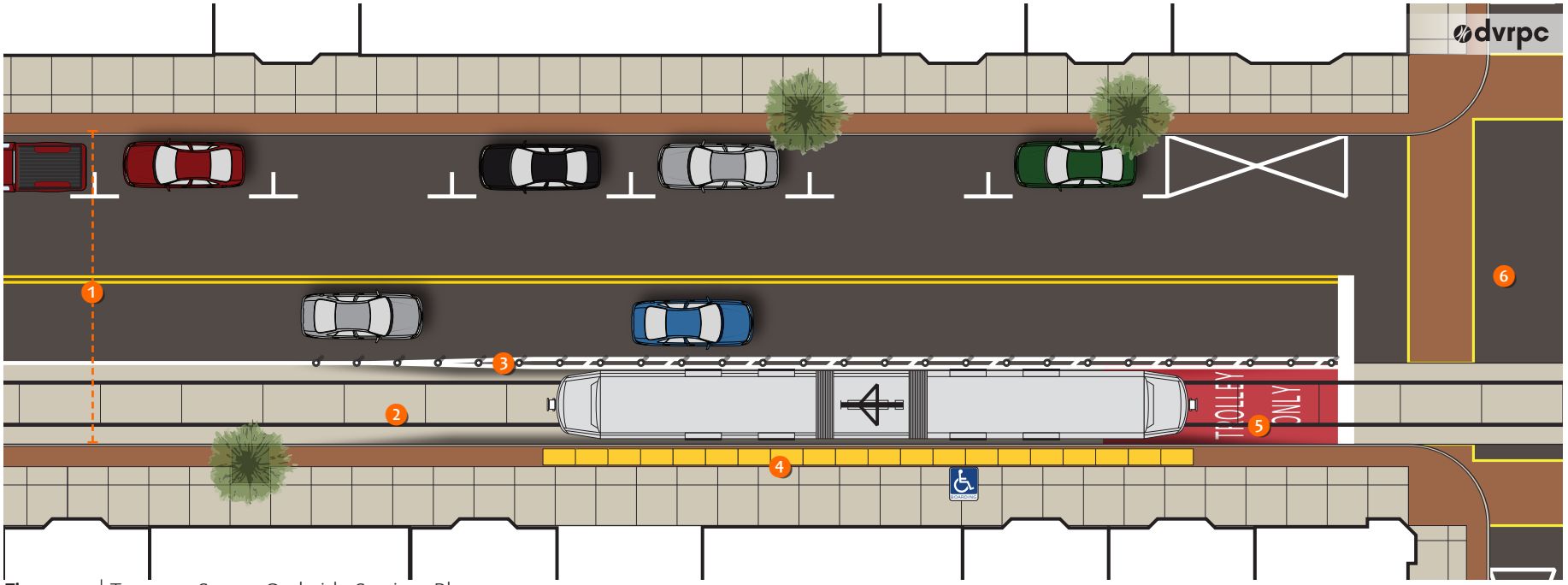


Figure 70 | Two-way Street: Curbside Station: Plan

Design Recommendations:

1. Reconfigure State Street as a two-way street with two travel lanes, one parking lane, and a curb-separated trolley right-of-way. See Figure 71, p. 47 for recommended lane measurements.

2. The trolley right-of-way should slope downward as it approaches the trolley station. This allows level- or near-level boarding directly from the existing sidewalk curb. Top-of-rail at the lowest part of the slope should be 10" below sidewalk height. (State Street's existing curb is 4–6" above the roadway, meaning the trolley right-of-way should slope downwards, 4–6" lower than the existing roadway.)

3. At stations, widen the lane edge marking to 1' to create a buffer, and use flexible bollards to prevent drivers from entering the lowered trolley stop location.

4. Passengers board a One-way Street Station directly from the sidewalk edge. Use detectable warning strips to indicate the boarding location. This boarding area must be kept clear of poles, street furniture, and other obstructions.

5. To prevent drivers from entering, mark the trolley right-of-way with red paint and "TROLLEY ONLY" pavement markings at intersections.

6. Use a leading trolley signal phase and "NO TURN ON RED" signs to restrict turning movements, mitigating conflicts between turning traffic and trolleys.

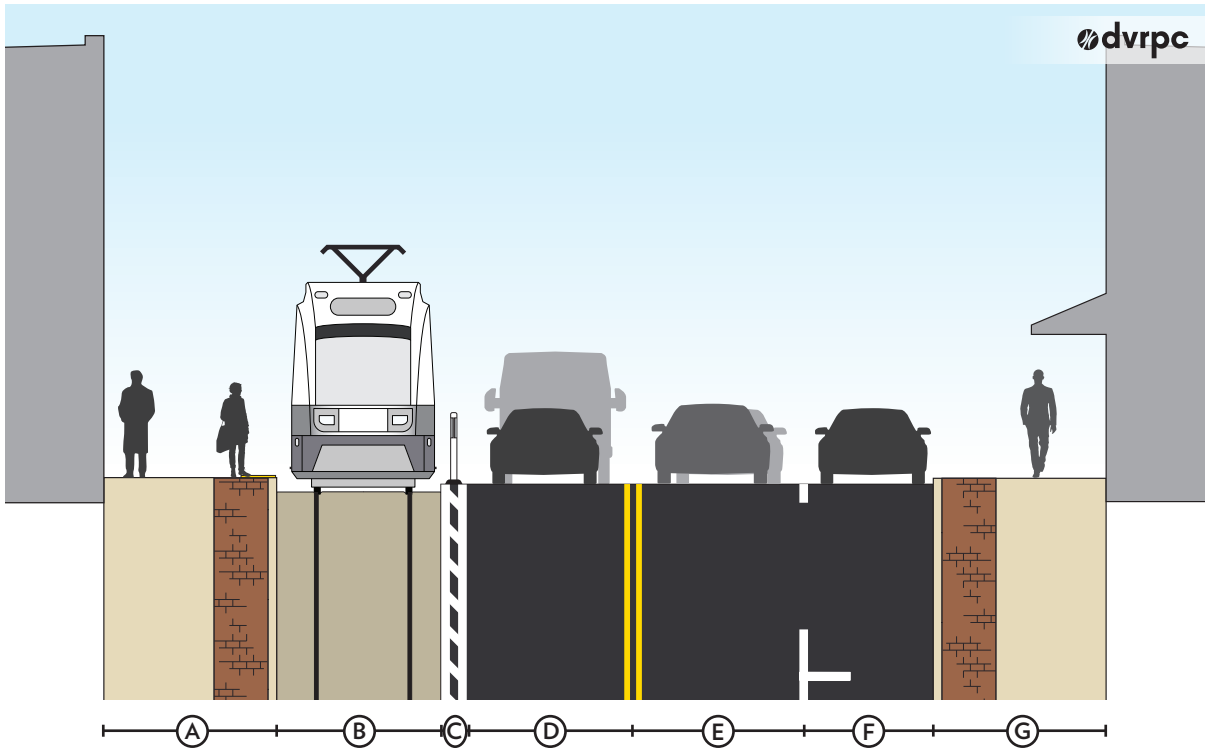


Figure 71 | Two-way Street: Curbside Station: Section (at station)

Dimension		Width
A	Sidewalk (existing)	10' - 0"
B	Trolley right-of-way (at station)	9' - 6"
C	Buffer	1' - 0"
D	Travel lane	10' - 0"

Dimension		Width
E	Travel lane	10' - 0"
F	Parking lane	7' - 6"
G	Sidewalk (existing)	10' - 0"

Streetscape Impacts:

Track:
This concept requires removing all of State Street's existing track, and laying one new set of tracks.

Traffic:
Existing traffic conflicts on State Street would be alleviated, and two-way traffic would be preserved. The resulting travel lanes are 10' wide at stations, presenting challenges for truck or bus traffic.

Parking:
This concept removes 50 percent of all on-street parking on State Street. Remaining parking spaces would be 1' wider than existing.

Pedestrian:
State Street's pedestrian environment would be unchanged in this scenario.

Construction:
State Street would be inaccessible to cars during most of construction. Appropriate phasing could allow the vehicular section of State Street to reopen before work is complete on the trolley right-of-way.

End-of-Line Treatment:

This station type's trolley right-of-way can function as an end-of-line layover location with a curbside platform.

F: One-way Street - Platform Station

In this scenario, State Street is reconfigured as a one-way street with two lanes of street parking, and a curbside, exclusive trolley right-of-way. Unlike the curbside iteration of this station concept, the trolley right-of-way need not slope downwards at stations. This concept preserves nearly all of State Street's existing curb parking, but sacrifices the ability to travel in both directions.

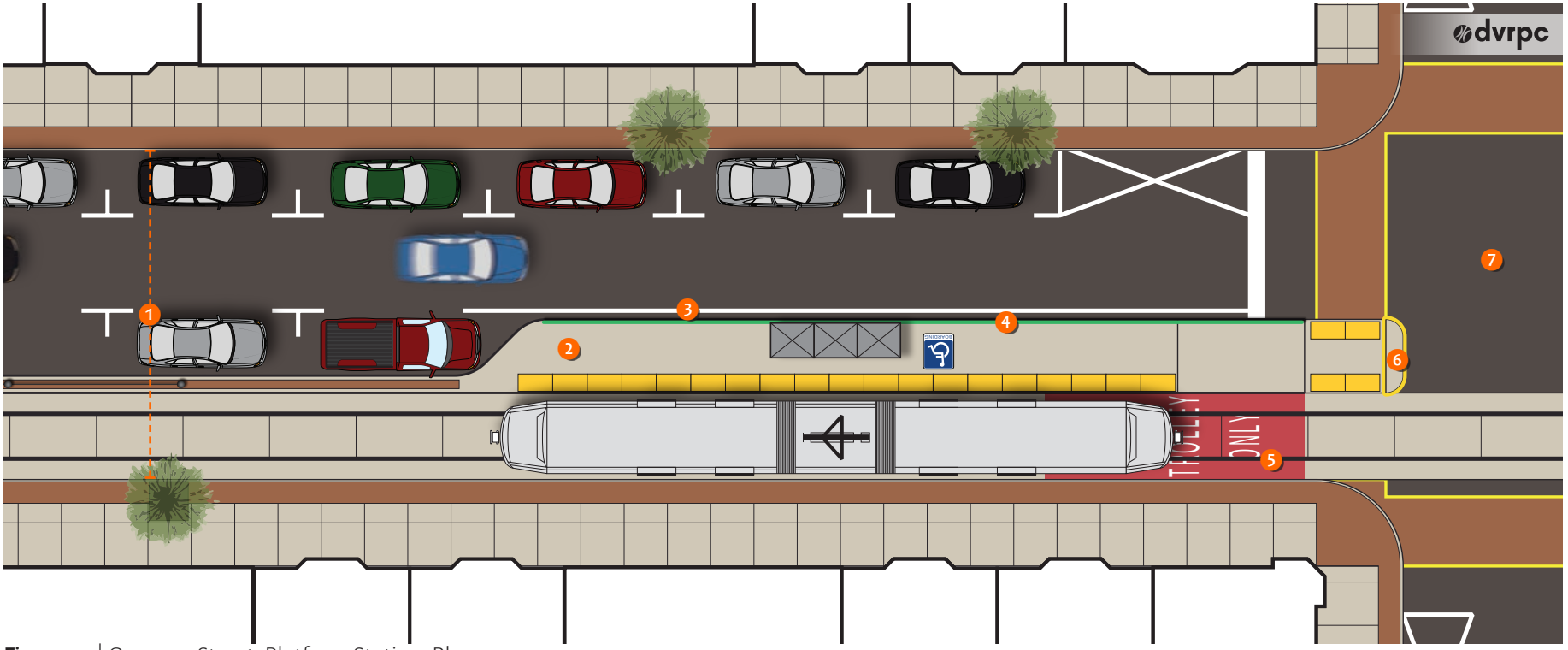


Figure 72 | One-way Street: Platform Station: Plan

Design Recommendations:

1. Reconfigure State Street as a one-way street with two parking lanes, one travel lane, and a curb-separated trolley right-of-way. See Figure 73, page 49 for recommended lane measurements.
2. An ADA-compliant platform (see Platform Elements, pg. 26) should occupy the parking lane closest to the trolley right-of-way, and the space provided by the 2'-wide curb buffer.
3. Create a lane offset by striping a solid white line 1' from the platform edge to prevent drivers from hitting the platform.
4. Use a handrail or other barrier to protect waiting passengers from adjacent traffic.
5. To prevent drivers from entering, mark the trolley right-of-way with red paint and "TROLLEY ONLY" pavement markings at intersections.
6. Include a pedestrian refuge island where the crosswalk meets the trolley right-of-way. Refuge islands must include detectable warning strips at either end, and a raised curb at the intersection to protect pedestrians from turning vehicles.
7. Use a leading trolley signal phase and "No Turn on Red" signs to restrict turning movements, mitigating conflicts between turning traffic and trolleys.

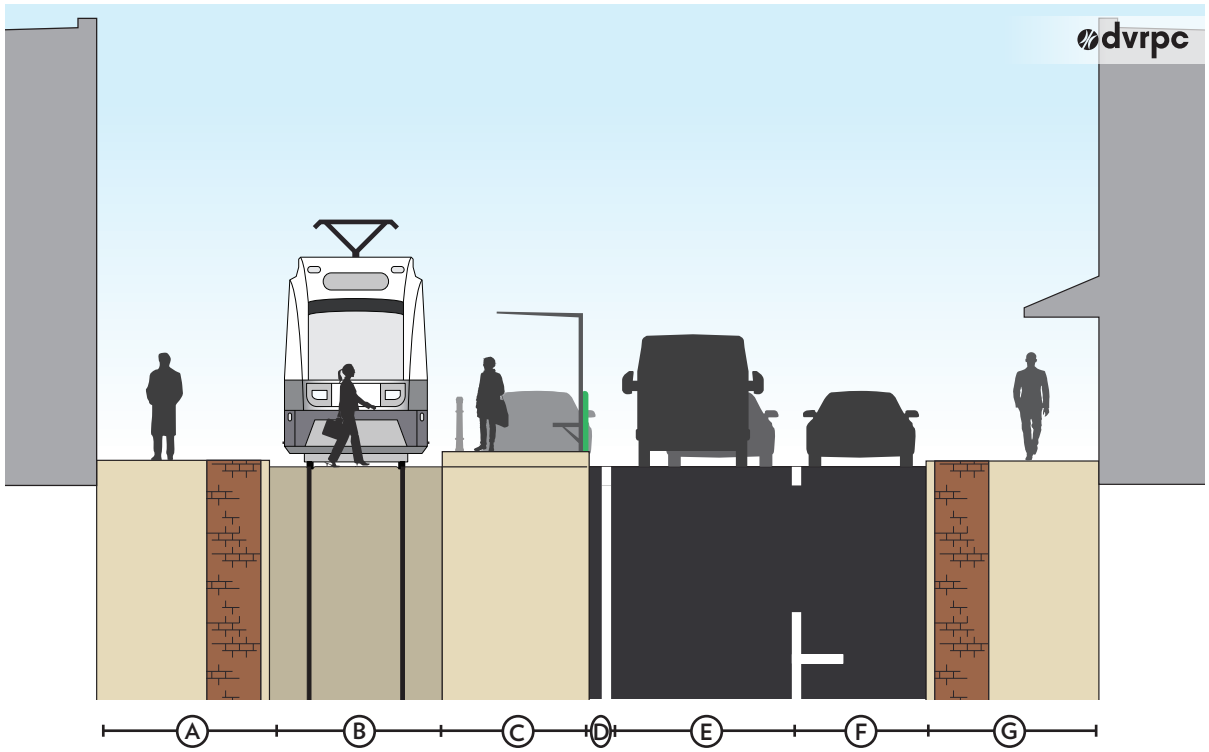


Figure 73 | One-way Street: Platform Station: Section

Dimension		Width
A	Sidewalk (existing)	10' - 0"
B	Trolley right-of-way (at station)	10' - 0"
C	Station platform	8' - 6"
D	Lane offset	1' - 0"

Dimension		Width
E	Travel lane	10' - 6"
F	Parking lane	8' - 0"
G	Sidewalk (existing)	10' - 0"

Streetscape Impacts:

Track:
This concept requires removing all of State Street's existing track, and laying one new set of tracks.

Traffic:
Existing traffic conflicts on State Street would be alleviated, but traffic would only be able to travel in one direction. A traffic study should be conducted before making State Street one-way.

Parking:
This concept preserves most existing parking on State Street. Two to three parking spaces would be removed per station platform. Parking lanes would be widened by one foot compared to existing conditions. Auto passengers in the trolley-side parking lane would be constrained as they exit their vehicles.

Pedestrian:
State Street would be improved for pedestrians under this scenario, with existing sidewalks preserved, and crossing distances shortened at intersections.

Construction:
State Street would be inaccessible to cars during most of construction. Appropriate phasing could allow the vehicular section of State Street to reopen before work is complete on the trolley right-of-way.

End-of-Line Treatment:

This station type's trolley right-of-way can function as an end-of-line layover location with a station platform.

Station Profiles:

This appendix lists each station on routes 101 and 102 along with statistics that will be relevant in the ongoing Trolley Modernization process. 69th Street Transportation Center is not considered here. Station profiles are meant as a first-look resource for planners and designers entering the preliminary design phase, or when considering stop consolidation on a systemwide basis.

Each station profile is made up of field photos and key station details, including:

- Station Attributes: Basic details on the station's location and right-of-way condition.
- Platform Measurements: Field measurements of each station platform, as taken by the project team in October and November 2015.
- Ridership: Average daily boards and alights in each direction, as collected by SEPTA in December 2015.

The project team then synthesized that data to develop a Trolley Modernization Checklist. This checklist should be used to compare stations across routes 101 and 102, helping planners and designers understand the challenges to providing a modern, ADA-compliant station at any existing stop location, and prioritize among stations.

Stations are evaluated on up to six variables, detailed in Table 15, and scored as either "OK", "Needs Attention," or "Major Challenge." Taken together, the Trolley Modernization Checklist scores should provide a basic understanding of the constructibility of each station. This checklist simply provides an overview, and should not substitute for detailed measurements, or a full ADA compliance review.

	O.K.	Needs Attention	Major Challenge
Platform Width	All platforms are at least 8' 6" wide for their entire length.	Some portion of one or more platforms is less than 8' 6" wide.	No part of either platform is 8' 6" wide.
Platform Length	All platforms are long enough to accommodate a modern trolley vehicle, and have space to ramp up to a 10"-high platform. (More than 90' long.)	One or more platforms are too short to accommodate a modern vehicle and/or a platform ramp, or could be lengthened relatively easily. (70' - 90' long.)	No platform is long enough to accommodate a modern trolley vehicle. (Less than 70' long.)
Tangent Track	The trolley tracks are tangent at the expected stop location for a modern trolley.	The trolley tracks have a minor curve, or a curve for a portion of the stop location.	The trolley tracks are too curved to provide an ADA-compliant platform.
Clear Platform Area	The station platforms are clear enough of obstructions to provide an ADA-compliant, accessible path to boarding locations on a modern trolley vehicle.	The platforms are partially obstructed, but the obstructions are movable, or unlikely to block boarding locations on a modern trolley vehicle.	A clear path on a platform is obstructed by fixed objects, such as catenary poles, which cannot be easily relocated.
Accessible Station Area	There is a barrier-free connection between the station platforms and the surrounding pedestrian network.	There are minimal barriers between the station platforms and pedestrian network, but accessibility elements, such as detectable warning surfaces, are not present.	Significant barriers exist between platforms and the pedestrian network, such as a step up to the platform, or there is no connection to the sidewalk network.
*Right-of-way Width**	The existing right-of-way is wide enough to accommodate an ADA-compliant platform for each direction. (Greater than 42'.)	The existing right-of-way may be able to accommodate an ADA-compliant platform for one or both directions, but likely only enough to provide minimum-width platforms. (38'–42'.)	The existing right-of-way is too narrow to accommodate ADA-compliant platforms in each direction. (Less than 38'.)

** Right-of-way measurements are based on drawings provided to the project team by SEPTA. Width requirements assume that double tracks are centered in the right-of-way, and that each track set is offset from the other by 12' center-to-center.*

Table 15 | Trolley Modernization checklist criteria

Ridership:

Existing ridership is an important measurement of demand for transit service at stations on routes 101 and 102. Each station is ranked in tables 16 through 18 using a "ridership score," which allows comparison between stations regardless of how frequently a trolley stops at that station.

$$\text{RIDERSHIP SCORE} = \frac{(\textit{TOTAL BOARDINGS} + \textit{TOTAL ALIGHTINGS})}{\textit{DAILY SCHEDULED TRIPS}}$$

At a station with a ridership score of 1.00, for example, one passenger would either board or alight each time a trolley arrives.

Stations are ranked according to their route segment (i.e., the Trunk Line, Route 101, and Route 102). The ridership ranked in Table 16 represents trips on both Route 101 and Route 102, as both routes share the trunk line.

More complete ridership statistics can be found on each station's profile page, beginning on page A-4.

TRUNK LINE			
RANK		STATION	RIDERSHIP SCORE
Segment	Systemwide		
1	1	69th Street Transportation Center	26.45
2	3	Lansdowne Avenue	5.54
3	6	Drexel Hill Junction	3.18
4	9	Beverly Boulevard	2.56
5	12	Avon Road	2.29
6	17	Walnut Street	1.74
7	19	Hilltop Road	1.73
8	29	Fairfield Avenue	1.13
9	34	Congress Avenue	0.94
10	47	Drexel Park	0.38
11	48	Irvington Road	0.34

Table 16 | Ridership rankings, Trunk Line

Source: SEPTA, 2015

ROUTE 101			
RANK			
Segment	Systemwide	STATION	RIDERSHIP SCORE
1	7	Springfield Mall	2.97
2	8	Aronimink	2.69
3	10	Providence Road	2.53
4	11	Orange Street	2.41
5	13	Monroe Street	2.23
6	18	Anderson Avenue	1.74
7	20	Drexeline	1.70
8	22	Drexelbrook	1.56
9	23	Jackson Street	1.48
10	25	Springfield Road	1.28
11	27	Scenic Road	1.24
12	28	Olive Street	1.21
13	30	Saxer Avenue	1.10
14	31	Veterans Square	1.08
15	32	Woodland Avenue	1.03
16	36	School Lane	0.86
17	38	Huey Avenue	0.77
18	41	Manchester Avenue	0.67
19	42	Edgmont Street	0.65
20	43	Beatty Road	0.51
21	44	Leamy Avenue	0.49
22	46	Thomson Avenue	0.42
23	49	Pine Ridge	0.32
24	50	Paper Mill Road	0.20

Table 17 | Ridership rankings, Route 101

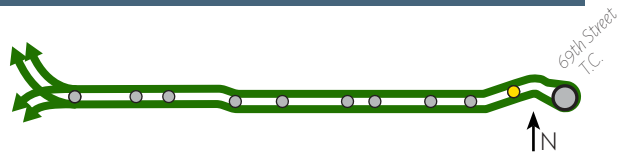
Source: SEPTA, 2015

ROUTE 102			
RANK			
Segment	Systemwide	STATION	RIDERSHIP SCORE
1	2	Sharon Hill	8.79
2	4	Baltimore Avenue	4.56
3	5	MacDade Boulevard	4.31
4	14	Garrettford	1.96
5	15	North Street	1.92
6	16	Marshall Road	1.89
7	21	Springfield Road	1.69
8	24	Drexel Manor	1.39
9	26	Clifton-Aldan	1.25
10	33	Providence Road	1.03
11	35	Bartram Avenue	0.88
12	37	Penn Street	0.79
13	39	Creek Road	0.73
14	40	Andrews Avenue	0.72
15	45	Magnolia Avenue	0.47

Table 18 | Ridership rankings, Route 102

Source: SEPTA, 2015

Fairfield Avenue



STATION ATTRIBUTES	
Route	Trunk
Municipality	Upper Darby
Condition	Off-street
Track Configuration	Double track

PLATFORM MEASUREMENTS

	Inbound	*Outbound*
Location	Near side	Far side
Length	147’	143’
Maximum Width	5’ 9”	7’ 10”
Minimum Width	5’ 9”	5’ 9”

RIDERSHIP

	Boards	*Alights*
Inbound	11	141
Outbound	113	26
Combined	123	167

Total Passengers	290
Daily Scheduled Trips	258
Ridership Score	1.12
Ridership Rank	29th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
69th Street Trans. Center	Walnut Street
945’	865’

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⚠
Platform Length	✓
Tangent Track	✓
Clear Platform Area	–
Accessible Station Area	–
Right-of-way Width	✓

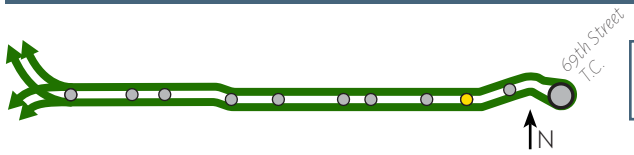
Notes:

This station is less than a quarter mile from the inbound terminal, 69th Street Transportation Center.

The stone shelter on the outbound platform may present a platform width constraint if this station were modernized.

Figure 74 | Fairfield Avenue, outbound platform

Figure 75 | Fairfield Avenue, inbound platform



Walnut Street

Figure 76 | Walnut Street, outbound platform

Figure 77 | Walnut Street, inbound platform

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⚠
Platform Length	✓
Tangent Track	✓
Clear Platform Area	–
Accessible Station Area	–
Right-of-way Width	⚠

Notes:

The Upper Darby Free Library is located across Bywood Avenue from this station (just left of frame in Figure 77).

Walnut Street, like the other three stations in the stretch from Walnut Street to Beverly Boulevard, is bounded by Bywood Avenue to the north, and Garrett Road to the south. These roadways introduce right-of-way constraints for each station.

STATION ATTRIBUTES	
Route	Trunk
Municipality	Upper Darby
Condition	Off-street
Track Configuration	Double track

PLATFORM MEASUREMENTS

	Inbound	*Outbound*
Location	Far side	Far side
Length	147’	147’
Maximum Width	5’ 9”	5’ 9”
Minimum Width	5’ 9”	5’ 9”

RIDERSHIP

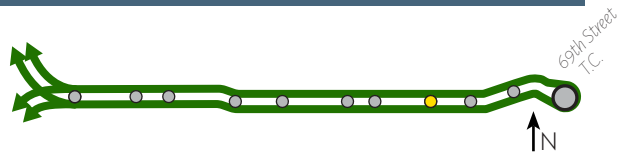
	Boards	*Alights*
Inbound	77	111
Outbound	141	123
Combined	217	233

Total Passengers	450
Daily Scheduled Trips	258
Ridership Score	1.47
Ridership Rank	17th

DISTANCE TO NEXT STATION

Inbound	*Outbound*
Fairfield Avenue	Avon Road
865’	670’

Avon Road



STATION ATTRIBUTES	
Route	Trunk
Municipality	Upper Darby
Condition	Off-street
Track Configuration	Double track

PLATFORM MEASUREMENTS

	Inbound	*Outbound*
Location	Far side	Far side
Length	147’	147’
Maximum Width	5’ 9”	5’ 9”
Minimum Width	5’ 9”	5’ 9”

RIDERSHIP

	Boards	*Alights*
Inbound	172	119
Outbound	116	185
Combined	288	303

Total Passengers	591
Daily Scheduled Trips	258
Ridership Score	2.29
Ridership Rank	12th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Walnut Street	Hilltop Road
670’	1100’

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⚠
Platform Length	✓
Tangent Track	✓
Clear Platform Area	–
Accessible Station Area	–
Right-of-way Width	⚠

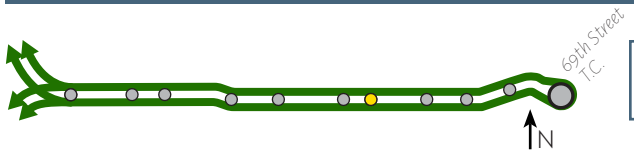
Notes:

Avon Road Station is located along the Garrett Road commercial corridor.

Avon Road, like the other three stations in the stretch from Walnut Street to Beverly Boulevard, is bounded by Bywood Avenue to the north, and Garrett Road to the south. These roadways introduce right-of-way constraints for each station.

Figure 78 | Avon Road, inbound platform

Figure 79 | Avon Road, outbound platform



Hilltop Road

Figure 80 | Hilltop Road, looking toward inbound platform

Figure 81 | Hilltop Road, inbound platform

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⚠
Platform Length	✓
Tangent Track	✓
Clear Platform Area	–
Accessible Station Area	–
Right-of-way Width	⚠

Notes:

Beverly Hills Middle School, serving approximately 1,500 students, is located across Garrett Road from Hilltop Road station.

Hilltop Road, like the other three stations in the stretch from Walnut Street to Beverly Boulevard, is bounded by Bywood Avenue to the north, and Garrett Road to the south. These roadways introduce right-of-way constraints for each station.

Hilltop Road is unusually close to the next outbound station, Beverly Boulevard.

STATION ATTRIBUTES	
Route	Trunk
Municipality	Upper Darby
Condition	Off-street
Track Configuration	Double track

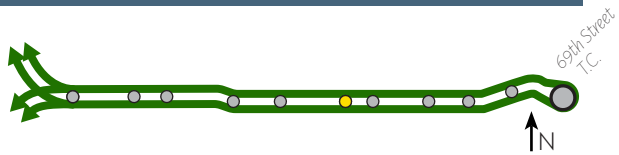
PLATFORM MEASUREMENTS	*Inbound*	*Outbound*
Location	Far side	Far side
Length	147’	147’
Maximum Width	5’ 9”	5’ 9”
Minimum Width	5’ 9”	5’ 9”

RIDERSHIP	*Boards*	*Alights*
Inbound	120	48
Outbound	72	209
Combined	192	256

Total Passengers	448
Daily Scheduled Trips	258
Ridership Score	1.73
Ridership Rank	19th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Avon Road	Beverly Boulevard
1100’	390’

Beverly Boulevard



STATION ATTRIBUTES	
Route	Trunk
Municipality	Upper Darby
Condition	Off-street
Track Configuration	Double track

PLATFORM MEASUREMENTS

	Inbound	*Outbound*
Location	Far side	Far side
Length	148’	127’
Maximum Width	5’ 9”	5’ 6”
Minimum Width	5’ 9”	5’ 6”

RIDERSHIP

	Boards	*Alights*
Inbound	292	89
Outbound	69	212
Combined	361	301

Total Passengers	662
Daily Scheduled Trips	258
Ridership Score	2.57
Ridership Rank	9th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Hilltop Road	Congress Avenue
390’	1380’

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⚠
Platform Length	✓
Tangent Track	✓
Clear Platform Area	–
Accessible Station Area	–
Right-of-way Width	⚠

Notes:

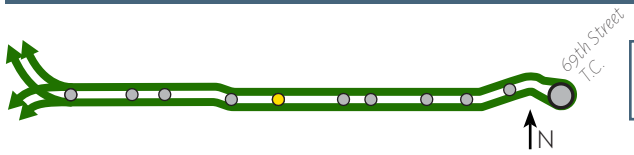
Barclay Square shopping center, featuring stores, offices, multifamily housing, and a Delaware County Community College location, is located across Garrett Road from Beverly Boulevard station.

Beverly Boulevard, like the other three stations in the stretch from Walnut Street to Beverly Boulevard, is bounded by Bywood Avenue to the north, and Garrett Road to the south. These roadways introduce right-of-way constraints for each station.

Beverly Boulevard is unusually close to the next station in the inbound direction, Hilltop Road.

Figure 82 | Beverly Boulevard, outbound platform

Figure 83 | Beverly Boulevard, inbound platform



Congress Avenue

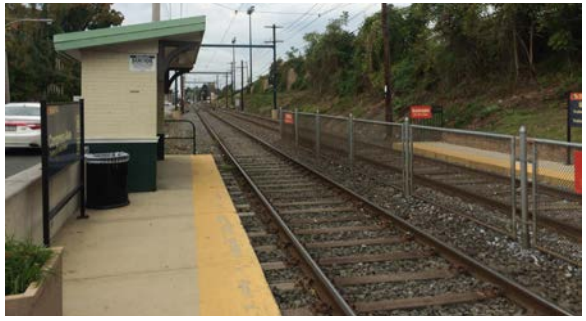


Figure 84 | Congress Avenue, inbound platform

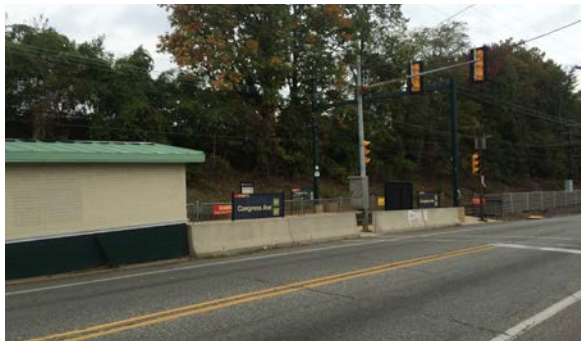


Figure 85 | Congress Avenue, viewed from Garrett Road

Figure 86 | Congress Avenue, outbound platform

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⚠
Platform Length	–
Tangent Track	✓
Clear Platform Area	–
Accessible Station Area	⚠
Right-of-way Width	⚠

Notes:

This station presents critical safety and accessibility challenges. The station can only be accessed by crossing busy Garrett Road, and only via one crosswalk, on the west side of Congress Avenue. Passengers at the outbound platform must cross both the inbound and outbound tracks to reach the station exit.

The existing pedestrian grade crossing is deteriorated, and the flangeway gaps do not appear to meet ADA standards.

The available right-of-way is constrained not only by Garrett Road, but also by a steep slope and retaining wall of an adjacent high school athletic field.

STATION ATTRIBUTES	
Route	Trunk
Municipality	Upper Darby
Condition	Off-street
Track Configuration	Double track

PLATFORM MEASUREMENTS	*Inbound*	*Outbound*
Location	Mid-block	Mid-block
Length	88’	88’
Maximum Width	7’ 6”	5’ 6”
Minimum Width	5’ 6”	5’ 6”

RIDERSHIP	*Boards*	*Alights*
Inbound	114	20
Outbound	20	90
Combined	134	110

Total Passengers	243
Daily Scheduled Trips	258
Ridership Score	0.94
Ridership Rank	34th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Beverly Boulevard	Lansdowne Avenue
1380’	970’

Lansdowne Avenue

STATION ATTRIBUTES	
Route	Trunk
Municipality	Upper Darby
Condition	Off-street
Track Configuration	Double track

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Congress Avenue	Drexel Park
970'	1250'

1: West Inbound Platform
2: West Outbound Platform
3: East Inbound Platform
4: East Outbound Platform

Figure 87 | Lansdowne Avenue aerial image

Source: Google Maps, 2016

PLATFORM MEASUREMENTS	*WEST INBOUND*	*WEST OUTBOUND*	*EAST INBOUND*	*EAST OUTBOUND*
Location	Near side	Far side	Far side	Near side
Length	100'	81'	115'	130'
Maximum Width	9' 6"	16'	11'	11'
Minimum Width	7' 6"	15' 6"	6' 3"	7' 6"

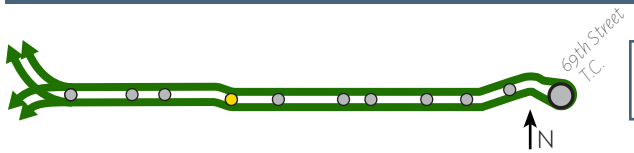
RIDERSHIP		
	Boards	*Alights*
West Inbound	274	240
West Outbound	138	463
East Inbound	143	4
East Inbound	126	44

Total Passengers	1,430
Daily Scheduled Trips	258
Ridership Score	5.54
Ridership Rank	3rd

WEST PLATFORMS	
Total Passengers	1,115
Daily Scheduled Trips	258
Ridership Score	4.32

EAST PLATFORMS	
Total Passengers	317
Daily Scheduled Trips	258
Ridership Score	1.22

Figure 88 | Lansdowne Avenue, a trolley waits at the east outbound platform



Lansdowne Avenue

Figure 89 | Lansdowne Avenue, west outbound platform

Figure 90 | Lansdowne Avenue, east inbound platform

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⊖
Platform Length	✓
Tangent Track	⊖
Clear Platform Area	⊖
Accessible Station Area	⊖
Right-of-way Width	⊖

Figure 91 | Lansdowne Avenue, west inbound platform

Notes:

Lansdowne Avenue Station serves Monsignor Bonner and Archbishop Prendergast Catholic High School, Delaware County Memorial Hospital, Upper Darby High School, and the Lansdowne YMCA. This is a unique station with platforms on both sides of the Garrett Road and Lansdowne Avenue intersection, for a total of four platforms.

The west platforms are used for all 101 and 102 service. The east platforms are only used during peak student commuter times. On the east platform SEPTA staff "loaders" assist with fare payment collection and passenger boarding and alighting.

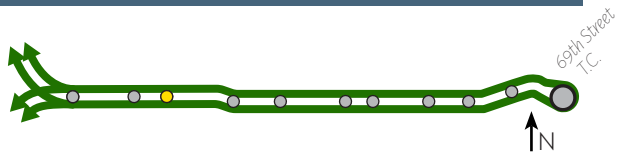
The intersection of Garrett Road and Lansdowne Avenue is unfriendly for pedestrians, with long wait times for a walk signal. SEPTA allows passengers to load on the east platforms because they are adjacent to the high school property, allowing passengers to travel between the station and the high schools without crossing a roadway.

Lansdowne Avenue has the highest ridership of any non-terminal station.

Transfers:

Bus Route 115 (weekday service only).

Drexel Park



STATION ATTRIBUTES	
Route	Trunk
Municipality	Upper Darby
Condition	Off-street
Track Configuration	Double track

PLATFORM MEASUREMENTS

	Inbound	*Outbound*
Location	Near side	Near side
Length	100’	100’
Maximum Width	5’ 6”	9’ 9”
Minimum Width	5’ 6”	6’ 6”

RIDERSHIP

	Boards	*Alights*
Inbound	36	9
Outbound	8	44
Combined	44	53

Total Passengers	97
Daily Scheduled Trips	258
Ridership Score	0.38
Ridership Rank	47th

DISTANCE TO NEXT STATION

Inbound	*Outbound*
Lansdowne Avenue	Irvington Road
1250’	630’

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⊖
Platform Length	✓
Tangent Track	✓
Clear Platform Area	⊖
Accessible Station Area	⚠
Right-of-way Width	✓

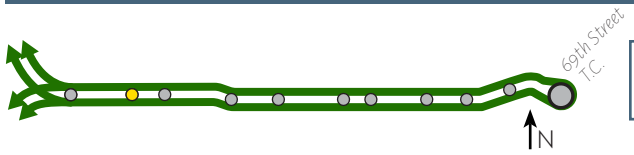
Notes:

Drexel Park station is located in a primarily single-family residential area, set back from a major road by one block. Its ridership is among the lowest in the Media/Sharon Hill Lines system.

The outbound platform requires passengers step up onto a curb (see Figure 93).

Figure 92 | Drexel Park, inbound platform

Figure 93 | Drexel Park, outbound platform



Irvington Road

Figure 94 | Irvington Road, outbound platform

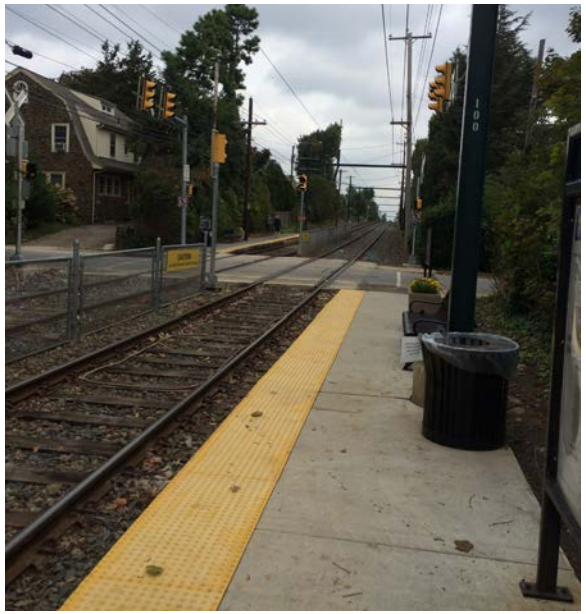


Figure 95 | Irvington Road, inbound platform (foreground)

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⚠
Platform Length	✓
Tangent Track	✓
Clear Platform Area	–
Accessible Station Area	–
Right-of-way Width	✓

Notes:

Irvington Road station is located in a primarily single-family residential area, set back from a major road by one block. Its ridership is among the lowest in the Media/Sharon Hill Lines system.

STATION ATTRIBUTES	
Route	Trunk
Municipality	Upper Darby
Condition	Off-street
Track Configuration	Double track

PLATFORM MEASUREMENTS

	Inbound	*Outbound*
Location	Near side	Near side
Length	100’	100’
Maximum Width	7’	6’ 6”
Minimum Width	7’	6’ 6”

RIDERSHIP

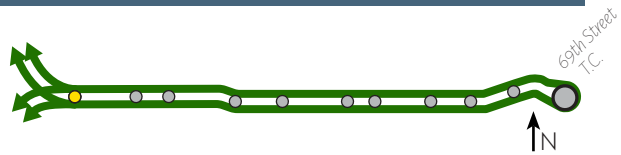
	Boards	*Alights*
Inbound	43	5
Outbound	5	37
Combined	47	41

Total Passengers	88
Daily Scheduled Trips	258
Ridership Score	0.34
Ridership Rank	48th

DISTANCE TO NEXT STATION

Inbound	*Outbound*
Drexel Park	Drexel Hill Junction
630’	1058’

Drexel Hill Junction



STATION ATTRIBUTES	
Route	Trunk
Municipality	Upper Darby
Condition	Off-street
Track Configuration	Double track

PLATFORM MEASUREMENTS	*Inbound*	*Outbound*
Location	Far side	Near side
Length	103’	96’
Maximum Width	9’ 9”	10’ 6”
Minimum Width	6’ 6”	6’ 9”

RIDERSHIP	*Boards*	*Alights*
Inbound	193	202
Outbound	201	225
Combined	394	427

Total Passengers	821
Daily Scheduled Trips	258
Ridership Score	3.18
Ridership Rank	6th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Irvington Road	Huey Avenue
1058’	1440’

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	➖
Platform Length	✓
Tangent Track	✓
Clear Platform Area	➖
Accessible Station Area	➖
Right-of-way Width	✓

Notes:

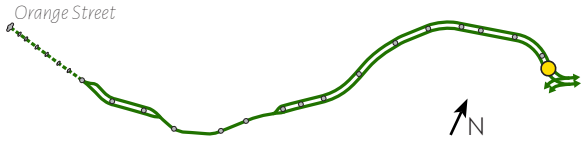
Drexel Hill Junction is the point at which the Media and Sharon Hill lines branch off from their shared trunk line. The station is located in downtown Drexel Hill, a small mixed-use node with shops, restaurants, offices, and housing.

Transfers:

Bus Route 107 (limited stop weekday express service only).

Figure 96 | Drexel Hill Junction, inbound platform

Figure 97 | Drexel Hill Junction, outbound platform



Huey Avenue

Figure 98 | Huey Avenue, inbound platform

Figure 99 | Huey Avenue, outbound platform

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⊖
Platform Length	✓
Tangent Track	✓
Clear Platform Area	⊖
Accessible Station Area	✓
Right-of-way Width	✓

Notes:

The platforms of this station are narrower than this guide's minimum standard, and are obstructed by station furniture. Additional right-of-way exists at the station, but existing landscaping, shelter, and utility poles must be considered if expanding the platforms to create an ADA-compliant clear path.

STATION ATTRIBUTES	
Route	101
Municipality	Upper Darby
Condition	Off-street
Track Configuration	Double track

PLATFORM MEASUREMENTS

	Inbound	*Outbound*
Location	Near side	Far side
Length	91'	104'
Maximum Width	8' 9"	7'
Minimum Width	7'	7'

RIDERSHIP

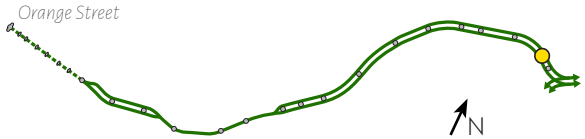
	Boards	*Alights*
Inbound	36	15
Outbound	10	49
Combined	46	64

Total Passengers	110
Daily Scheduled Trips	142
Ridership Score	0.77
Ridership Rank	38th

DISTANCE TO NEXT STATION

Inbound	*Outbound*
Drexel Hill Junction	School Lane
1440'	630'

School Lane



STATION ATTRIBUTES	
Route	101
Municipality	Upper Darby
Condition	Off-street
Track Configuration	Double track

PLATFORM MEASUREMENTS	*Inbound*	*Outbound*
Location	Near side	Far side
Length	114’	101’
Maximum Width	10’4”	7’8”
Minimum Width	7’	7’8”

RIDERSHIP	*Boards*	*Alights*
Inbound	53	12
Outbound	13	45
Combined	66	57

Total Passengers	123
Daily Scheduled Trips	142
Ridership Score	0.86
Ridership Rank	36th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Huey Avenue	Aronimink
630’	1690’

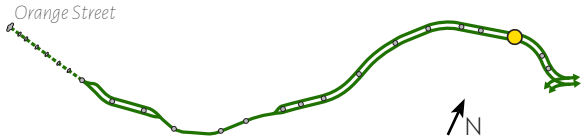
TROLLEY MODERNIZATION CHECKLIST	
Platform Width	➖
Platform Length	✅
Tangent Track	➖
Clear Platform Area	➖
Accessible Station Area	✅
Right-of-way Width	➖

Notes:

The platforms at this station are narrower than this guide’s minimum standard. The size of the outbound platform is constrained by a church property abutting the station right-of-way.

Figure 100 | School Lane, inbound platform

Figure 101 | School Lane, outbound platform



Aronimink

Figure 102 | Aronimink, inbound platform

Figure 103 | Aronimink, outbound platform

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	➖
Platform Length	✅
Tangent Track	➖
Clear Platform Area	➖
Accessible Station Area	✅
Right-of-way Width	➖

Notes:

The station is located along a commercial corridor in Drexel Hill. The outbound platform is obstructed near the entrance by a catenary pole, though the platform still provides a 3'-0"-wide clear path between the platform edge and the catenary pole, as required by ADA (see Figure 103). The outbound platform's width is constrained by an adjacent bank's driveway.

STATION ATTRIBUTES	
Route	101
Municipality	Upper Darby
Condition	Off-street
Track Configuration	Double track

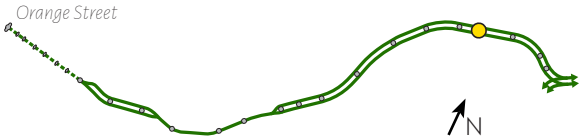
PLATFORM MEASUREMENTS	*Inbound*	*Outbound*
Location	Near side	Far side
Length	100'	90'
Maximum Width	9'4"	9'10"
Minimum Width	9'4"	6'2"

RIDERSHIP	*Boards*	*Alights*
Inbound	165	33
Outbound	26	159
Combined	191	192

Total Passengers	382
Daily Scheduled Trips	142
Ridership Score	2.69
Ridership Rank	8th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
School Lane	Anderson Avenue
1690'	1850'

Anderson Avenue



STATION ATTRIBUTES	
Route	101
Municipality	Upper Darby
Condition	Off-street
Track Configuration	Double track

PLATFORM MEASUREMENTS	*Inbound*	*Outbound*
Location	Mid-block	Mid-block
Length	97’	98’
Maximum Width	7’3”	10’1”
Minimum Width	7’3”	6’5”

RIDERSHIP	*Boards*	*Alights*
Inbound	108	17
Outbound	27	97
Combined	135	113

Total Passengers	248
Daily Scheduled Trips	142
Ridership Score	1.74
Ridership Rank	18th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Aronimink	Drexelbrook
1850’	820’

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	➖
Platform Length	✔
Tangent Track	✔
Clear Platform Area	➖
Accessible Station Area	⚠
Right-of-way Width	➖

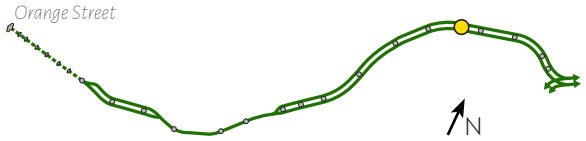
Notes:

This station is located off-street behind an apartment complex and a block of single family homes. Both platforms are elevated from the adjacent roadways by 1–3 feet. The outbound platform features a ramp to the sidewalk on Anderson Avenue, but requires a step up onto the platform. The inbound platform is accessed by a set of five stairs leading from the apartment complex’s parking lot. There is no sidewalk connection from the parking lot to the street network.

Neither platform’s width is ADA-compliant and both have right-of-way constraints. The at-grade pedestrian crossing within the station features flangeway gaps that do not appear to meet ADA standards.

Figure 104 | Anderson Avenue, inbound platform

Figure 105 | Anderson Avenue, outbound platform



Drexelbrook

Figure 106 | Drexelbrook, inbound platform

Figure 107 | Drexelbrook, outbound platform

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⊖
Platform Length	✓
Tangent Track	✓
Clear Platform Area	⊖
Accessible Station Area	⊖
Right-of-way Width	⊖

Notes:

This station is located at the entrance to the Drexelbrook apartment complex, and within 300 feet of a small shopping center.

The outbound platform of the station is narrower than this guide's minimum standard and features a constrained right-of-way that abuts a private property.

STATION ATTRIBUTES	
Route	101
Municipality	Upper Darby
Condition	Off-street
Track Configuration	Double track

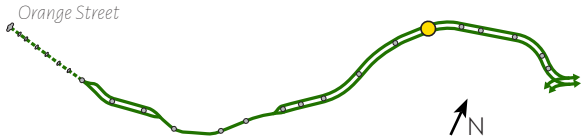
PLATFORM MEASUREMENTS	*Inbound*	*Outbound*
Location	Near side	Far side
Length	94'	100'
Maximum Width	10'3"	6'5"
Minimum Width	7'	6'5"

RIDERSHIP	*Boards*	*Alights*
Inbound	96	16
Outbound	16	94
Combined	112	109

Total Passengers	221
Daily Scheduled Trips	142
Ridership Score	1.56
Ridership Rank	22nd

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Anderson Avenue	Drexeline
820'	1700'

Drexeline



STATION ATTRIBUTES	
Route	101
Municipality	Upper Darby
Condition	Off-street
Track Configuration	Double track

PLATFORM MEASUREMENTS

	Inbound	*Outbound*
Location	Mid-block	Mid-block
Length	73’	73’
Maximum Width	9’	5’6”
Minimum Width	9’	5’6”

RIDERSHIP

	Boards	*Alights*
Inbound	104	20
Outbound	14	105
Combined	118	124

Total Passengers	242
Daily Scheduled Trips	142
Ridership Score	1.70
Ridership Rank	20th

DISTANCE TO NEXT STATION

Inbound	*Outbound*
Drexelbrook	Scenic Road
1700’	1825’

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	➖
Platform Length	⚠
Tangent Track	✔
Clear Platform Area	➖
Accessible Station Area	➖
Right-of-way Width	➖

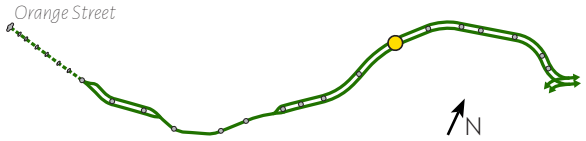
Notes:

This station is located across a parking lot behind the Drexeline Shopping Center. The station does not have pedestrian facilities connecting it to the street network.

The inbound platform is only accessible via a grade crossing, which is in relatively poor condition and does not appear to meet current ADA standards. The inbound platform is also narrower than standard and has right-of-way limitations due to a steep embankment behind it.

Figure 108 | Drexeline inbound platform

Figure 109 | Drexeline Station area



Scenic Road

Figure 110 | Scenic Road, inbound platform

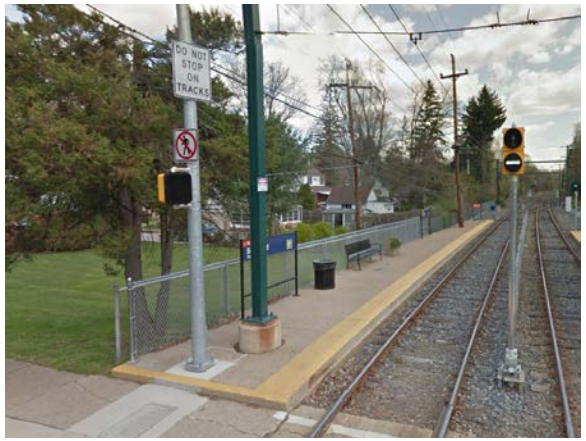


Figure 111 | Scenic Road, outbound platform

Source: Google

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	✓
Platform Length	✓
Tangent Track	✓
Clear Platform Area	!
Accessible Station Area	!
Right-of-way Width	✓

Notes:

The outbound platform of the station has no accessible ramp and is blocked by catenary and traffic signal poles.

STATION ATTRIBUTES	
Route	101
Municipality	Springfield
Condition	Off-street
Track Configuration	Double track

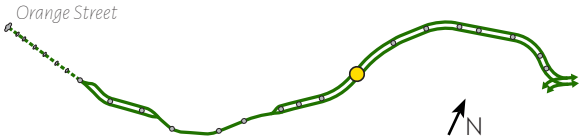
PLATFORM MEASUREMENTS	*Inbound*	*Outbound*
Location	Near side	Far side
Length	127’	96”
Maximum Width	9’9”	9’7”
Minimum Width	9’9”	7’6”

RIDERSHIP	*Boards*	*Alights*
Inbound	83	10
Outbound	8	77
Combined	91	86

Total Passengers	177
Daily Scheduled Trips	142
Ridership Score	1.24
Ridership Rank	27th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Drexeline	Springfield Road
1825’	2440’

Springfield Road



STATION ATTRIBUTES	
Route	101
Municipality	Springfield
Condition	Off-street
Track Configuration	Double track

PLATFORM MEASUREMENTS

	Inbound	*Outbound*
Location	Far side	Far side
Length	96’	128’
Maximum Width	9’ 7”	10’9”
Minimum Width	7’	10’9”

RIDERSHIP

	Boards	*Alights*
Inbound	77	13
Outbound	15	78
Combined	92	91

Total Passengers	182
Daily Scheduled Trips	142
Ridership Score	1.28
Ridership Rank	25th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Scenic Road	Saxer Avenue
2440’	2165’

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	✓
Platform Length	✓
Tangent Track	✓
Clear Platform Area	–
Accessible Station Area	✓
Right-of-way Width	–

Notes:

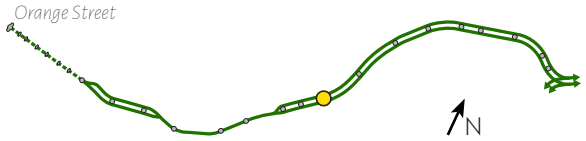
This station was renovated in 2009 with new ADA-compliant connections between the platforms and the adjacent sidewalk network.

Some platform obstructions exist. A catenary pole on the outbound platform blocks clear platform access, but leaves enough space for an ADA-compliant clear path.

The station has a free daily parking lot with 29 spaces near the outbound platform.

Figure 112 | Springfield Road, inbound platform

Figure 113 | Springfield Road, outbound platform



Saxer Avenue

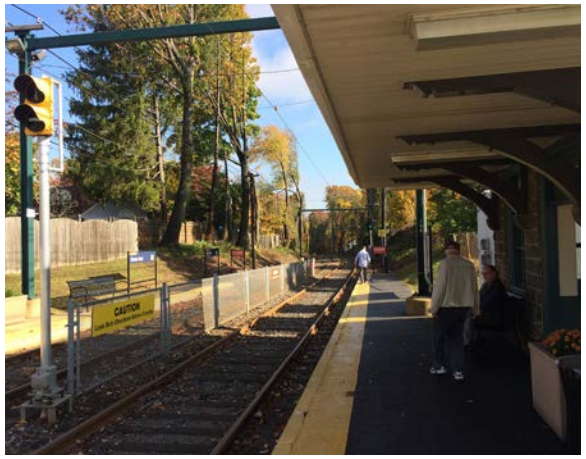


Figure 114 | Saxer Avenue, inbound platform

Figure 115 | Saxer Avenue, outbound platform

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	➖
Platform Length	➖
Tangent Track	✅
Clear Platform Area	➖
Accessible Station Area	✅
Right-of-way Width	➖

Notes:

The outbound platform of the station is narrower than this guide's minimum standard and is constrained by signal and catenary poles, as well as an embankment leading towards an adjacent property.

STATION ATTRIBUTES	
Route	101
Municipality	Springfield
Condition	Off-street
Track Configuration	Double track

PLATFORM MEASUREMENTS

	Inbound	*Outbound*
Location	Near side	Far side
Length	96'	85'
Maximum Width	9' 7"	5' 7"
Minimum Width	7'	5' 7"

RIDERSHIP

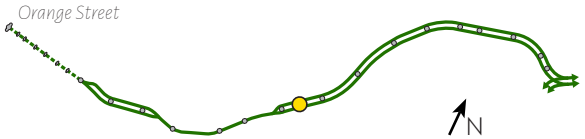
	Boards	*Alights*
Inbound	61	14
Outbound	12	70
Combined	73	84

Total Passengers	157
Daily Scheduled Trips	142
Ridership Score	1.10
Ridership Rank	30th

DISTANCE TO NEXT STATION

Inbound	*Outbound*
Springfield Road	Leamy Avenue
2165'	1280'

Leamy Avenue



STATION ATTRIBUTES	
Route	101
Municipality	Springfield
Condition	Off-street
Track Configuration	Double track

PLATFORM MEASUREMENTS	*Inbound*	*Outbound*
Location	Far side	Near side
Length	121’	86’
Maximum Width	6’ 2”	6’
Minimum Width	6’ 2”	6’

RIDERSHIP	*Boards*	*Alights*
Inbound	30	5
Outbound	10	25
Combined	40	30

Total Passengers	70
Daily Scheduled Trips	142
Ridership Score	0.49
Ridership Rank	44th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Saxer Avenue	Woodland Avenue
1280’	785’

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⚠
Platform Length	–
Tangent Track	✓
Clear Platform Area	–
Accessible Station Area	–
Right-of-way Width	–

Notes:

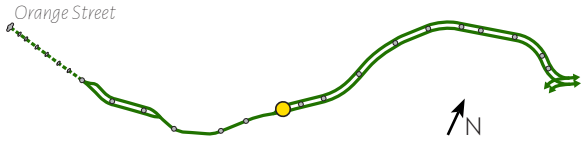
This station is located next to Springfield High School, though it appears very few students use the station for transportation to or from school.

Both station platforms are narrower than this guide’s minimum standard and are obstructed by catenary poles and shelters, though neither platform’s obstructions appear to prevent an ADA-compliant clear walkway. The inbound platform is further constrained by an embankment leading towards an adjacent property.

Figure 116 | Leamy Avenue, inbound platform

Figure 117 | Leamy Avenue, station

Source: Google



Woodland Avenue

Figure 118 | Woodland Avenue, platform looking west

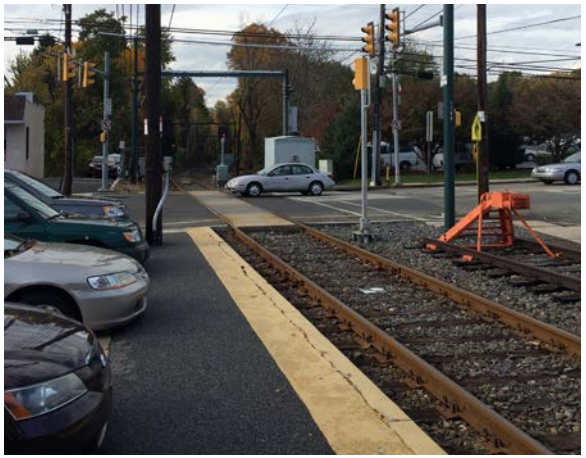


Figure 119 | Woodland Avenue, platform looking east

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⊖
Platform Length	✓
Tangent Track	✓
Clear Platform Area	⚠
Accessible Station Area	⊖
Right-of-way Width	⊖

Notes:

The station platform has a utility pole that blocks access to the station from the sidewalk (see Figure 119).

The station has parking for four vehicles adjacent to the platform. Cars parked in these spaces tend to hang over the platform edge as shown in Figures 118 and 119.

STATION ATTRIBUTES	
Route	101
Municipality	Springfield
Condition	Off-street
Track Configuration	Single track

PLATFORM MEASUREMENTS	
Location	Near/Far side
Length	103’
Maximum Width	9’7”
Minimum Width	7’

RIDERSHIP

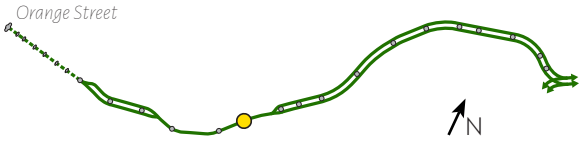
	Boards	Alights
Inbound	53	11
Outbound	25	59
Combined	78	69

Total Passengers	147
Daily Scheduled Trips	142
Ridership Score	1.03
Ridership Rank	32nd

DISTANCE TO NEXT STATION

Inbound	*Outbound*
Leamy Avenue	Thomson Avenue
785’	2040’

Thomson Avenue



STATION ATTRIBUTES	
Route	101
Municipality	Springfield
Condition	Off-street
Track Configuration	Single track

PLATFORM MEASUREMENTS	
Location	Near/Far side
Length	42’
Maximum Width	7’
Minimum Width	7’

RIDERSHIP

	Boards	*Alights*
Inbound	18	5
Outbound	4	18
Combined	21	22

Total Passengers	43
Daily Scheduled Trips	102
Ridership Score	0.42
Ridership Rank	46th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Woodland Avenue	Springfield Mall
2040’	1370’

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⚠
Platform Length	⚠
Tangent Track	✓
Clear Platform Area	–
Accessible Station Area	⚠
Right-of-way Width	–

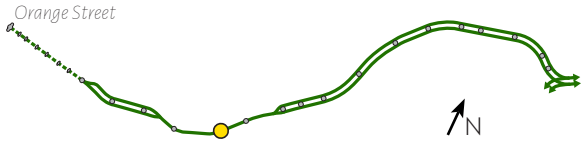
Notes:

This station is located in a heavily-wooded area with steep topography, discontinuous sidewalks, and no pedestrian crossings (see Figure 121).

The station platform is shorter and narrower than this guide’s minimum standard and has limited right-of-way width due to a steep embankment located behind the station platform.

Figure 120 | Thomson Avenue, platform

Figure 121 | Thomson Avenue, station area
Source: Google



Springfield Mall

Figure 122 | Springfield Mall, platform

Figure 123 | Driveway from station to Springfield Mall
Source: SEPTA

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⊖
Platform Length	✓
Tangent Track	✓
Clear Platform Area	⊖
Accessible Station Area	⚠
Right-of-way Width	⊖

Notes:

Springfield Mall station is the highest ridership Route 101 station outside of the trunk line, but is also one of the most challenging station areas for Trolley Modernization.

The station is accessible only by a three-flight staircase from Sproul Road, or a steep driveway leading to Springfield Mall. There is limited sidewalk space on Sproul Road for an elevator. As the driveway sits mostly on mall property, cooperation with mall ownership would be essential if an ADA-compliant sidewalk is to be built.

Transfers:

Bus routes 107, 109, and 110 stop in the mall parking lot, one-third of a mile mile from the trolley station. There may be an opportunity to improve this bus-trolley transfer along with Trolley Modernization improvements.

STATION ATTRIBUTES	
Route	101
Municipality	Springfield
Condition	Off-street
Track Configuration	Single track

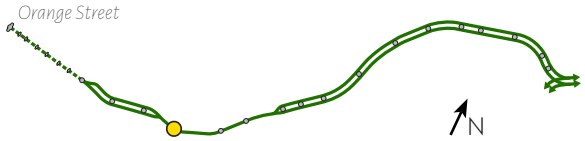
PLATFORM MEASUREMENTS	
Location	Off-street
Length	109’
Maximum Width	14’8”
Minimum Width	7’2”

RIDERSHIP		
	Boards	*Alights*
Inbound	123	42
Outbound	26	113
Combined	149	155

Total Passengers	303
Daily Scheduled Trips	102
Ridership Score	2.97
Ridership Rank	7th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Thomson Avenue	Paper Mill Road
1370’	2670’

Paper Mill Road



STATION ATTRIBUTES	
Route	101
Municipality	Springfield
Condition	Off-street
Track Configuration	Single track

PLATFORM MEASUREMENTS	
Location	Far/Near side
Length	42’
Maximum Width	7’
Minimum Width	7’

RIDERSHIP	*Boards*	*Alights*
Inbound	8	3
Outbound	1	9
Combined	9	12

Total Passengers	20
Daily Scheduled Trips	102
Ridership Score	0.20
Ridership Rank	50th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Springfield Mall	Pine Ridge
2670’	3400’

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⚠
Platform Length	⚠
Tangent Track	✓
Clear Platform Area	–
Accessible Station Area	⚠
Right-of-way Width	–

Notes:

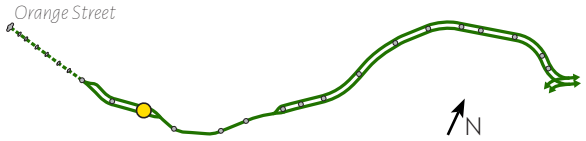
Paper Mill Road station is located in Smedley Park, a county park along Crum Creek.

The platform is shorter and narrower than this guide’s minimum standards, though it was updated in 2009 with detectable warning strips.

There is no sidewalk along Paper Mill Road. Aside from the trolley station, the only way to access Smedley Park is by car, or by a hiking trail that meets Baltimore Pike at I-476, an unfriendly pedestrian environment from an accessibility perspective.

Figure 124 | Paper Mill Road, platform

Figure 125 | Paper Mill Road, station area



Pine Ridge

Figure 126 | Pine Ridge, inbound platform

Figure 127 | Pine Ridge, outbound platform

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⚠
Platform Length	⚠
Tangent Track	✓
Clear Platform Area	–
Accessible Station Area	–
Right-of-way Width	–

Notes:

Pine Ridge Station is located in a low-density residential area. There are 12 parking spaces in a small lot adjacent to the inbound platform.

There is one sidewalk that leads south from the station, but ends at high-traffic Baltimore Pike. The Chesley Office Complex is accessible via this sidewalk. Otherwise, there are no sidewalks in the station area.

The station platforms do not meet this guide's minimum standards.

STATION ATTRIBUTES	
Route	101
Municipality	Nether Providence
Condition	Off-street
Track Configuration	Double track

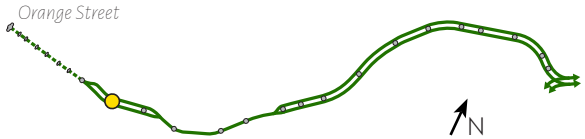
PLATFORM MEASUREMENTS	*Inbound*	*Outbound*
Location	Near side	Far side
Length	93'	45'
Maximum Width	9' 10"	6'
Minimum Width	6' 7"	6'

RIDERSHIP	*Boards*	*Alights*
Inbound	16	1
Outbound	1	16
Combined	17	16

Total Passengers	33
Daily Scheduled Trips	102
Ridership Score	0.32
Ridership Rank	49th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Paper Mill Road	Beatty Road
3400'	1855'

Beatty Road



STATION ATTRIBUTES	
Route	101
Municipality	Nether Providence
Condition	Off-street
Track Configuration	Double track

PLATFORM MEASUREMENTS

	Inbound	*Outbound*
Location	Far side	Near side
Length	145’	142’
Maximum Width	9’ 5”	7’ 4”
Minimum Width	9’ 5”	7’ 4”

RIDERSHIP

	Boards	*Alights*
Inbound	21	1
Outbound	1	30
Combined	22	31

Total Passengers	52
Daily Scheduled Trips	102
Ridership Score	0.51
Ridership Rank	43rd

DISTANCE TO NEXT STATION

Inbound	*Outbound*
Pine Ridge	Providence Road
1855’	1023’

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	➖
Platform Length	✅
Tangent Track	✅
Clear Platform Area	➖
Accessible Station Area	➖
Right-of-way Width	➖

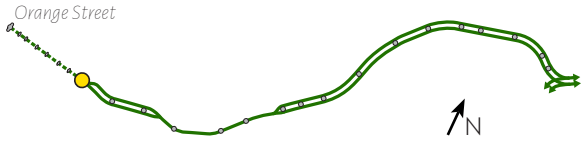
Notes:

Beatty Road station is located between a residential area, a series of small office buildings, and a shopping center. There are short stretches of sidewalk heading south from the station platforms, but the station is not otherwise tied into a sidewalk network.

Both platforms were upgraded in 2009. The outbound platform is slightly narrower than this guide’s minimum standard.

Figure 128 | Beatty Road, inbound platform

Figure 129 | Beatty Road, outbound platform



Providence Road

Figure 130 | Providence Road looking east

Figure 131 | Providence Road looking west

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⊖
Platform Length	⊖
Tangent Track	✓
Clear Platform Area	✓
Accessible Station Area	✓
Right-of-way Width	⊖

Notes:

Providence Road is the last Route 101 station in a dedicated trolley right-of-way before trolleys enter mixed traffic on State Street. The right of way switches from double to single track at a switch a few feet east of the station platform.

The shared inbound/outbound platform is mostly large enough to meet this guide's minimum standards, though it is slightly shorter than the 80' recommended length.

STATION ATTRIBUTES	
Route	101
Municipality	Media
Condition	Off-street
Track Configuration	Single track

PLATFORM MEASUREMENTS	
Location	Near side
Length	76'
Maximum Width	12' 10"
Minimum Width	6' 6"

RIDERSHIP

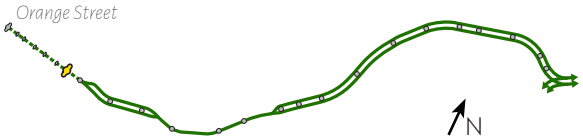
	Boards	*Alights*
Inbound	150	6
Outbound	7	97
Combined	157	102

Total Passengers	259
Daily Scheduled Trips	102
Ridership Score	2.53
Ridership Rank	10th

DISTANCE TO NEXT STATION

Inbound	*Outbound*
Beatty Road	Manchester Avenue
1023'	563'

Manchester Avenue



STATION ATTRIBUTES	
Route	101
Municipality	Media
Condition	On-street
Track Configuration	Single track

STOP CONFIGURATION	*Inbound*	*Outbound*
Location	Near side	Near side

RIDERSHIP	*Boards*	*Alights*
Inbound	32	3
Outbound	1	33
Combined	33	36

Total Passengers	69
Daily Scheduled Trips	102
Ridership Score	0.67
Ridership Rank	43rd

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Providence Road	Edgmont Street
563’	800’

TROLLEY MODERNIZATION CHECKLIST	
Accessible Station Area	⊟
Tangent Track	✓

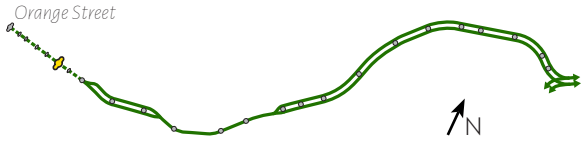
Notes:

This portion of State Street is primarily residential, though the block to the east features a new Wawa and a motel.

No corner at this intersection features an ADA-compliant curb ramp.

Figure 132 | Manchester Avenue, inbound stop

Figure 133 | Manchester Avenue, outbound stop



Edgmont Street

Figure 134 | Edgmont Street, outbound stop

Figure 135 | Edgmont Street, inbound stop

TROLLEY MODERNIZATION CHECKLIST	
Accessible Station Area	⊖
Tangent Track	✓

Notes:

The outbound stop location is in front of Barrall Community Park. The block of Edgmont Street north of State Street has movable gates that are closed while students from nearby Media Elementary School play.

No corner at this intersection features an ADA-compliant curb ramp.

STATION ATTRIBUTES	
Route	101
Municipality	Media
Condition	On-street
Track Configuration	Single track

STOP CONFIGURATION

	Inbound	*Outbound*
Location	Near side	Near side

RIDERSHIP

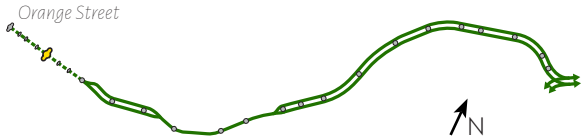
	Boards	*Alights*
Inbound	30	2
Outbound	1	35
Combined	30	37

Total Passengers	67
Daily Scheduled Trips	102
Ridership Score	0.65
Ridership Rank	42nd

DISTANCE TO NEXT STATION

Inbound	*Outbound*
Manchester Avenue	Monroe Street
800’	560’

Monroe Street



STATION ATTRIBUTES	
Route	101
Municipality	Media
Condition	On-street
Track Configuration	Single track

STOP CONFIGURATION	*Inbound*	*Outbound*
Location	Near side	Near side

RIDERSHIP	*Boards*	*Alights*
Inbound	111	0
Outbound	1	116
Combined	112	116

Total Passengers	228
Daily Scheduled Trips	102
Ridership Score	2.23
Ridership Rank	13th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Edgemont Street	Jackson Street
560’	520’

TROLLEY MODERNIZATION CHECKLIST	
Accessible Station Area	⊖
Tangent Track	✓

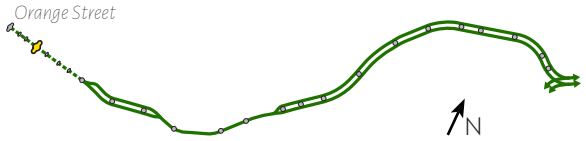
Notes:

Monroe Street marks the transition from eastern State Street’s residential, institutional, and office land uses, and western State Street’s downtown commercial corridor.

No corner at this intersection features an ADA-compliant curb ramp.

Figure 136 | Monroe Street, outbound stop

Figure 137 | Monroe Street, inbound stop



Jackson Street

Figure 138 | Jackson Street, outbound stop

Figure 139 | Jackson Street, inbound stop

TROLLEY MODERNIZATION CHECKLIST	
Accessible Station Area	⊖
Tangent Track	✓

Notes:

No corner at this intersection features an ADA-compliant curb ramp.

Transfers:

Bus Route 118.

STATION ATTRIBUTES	
Route	101
Municipality	Media
Condition	On-street
Track Configuration	Single track

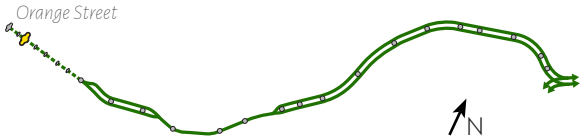
STOP CONFIGURATION	*Inbound*	*Outbound*
Location	Near side	Near side

RIDERSHIP	*Boards*	*Alights*
Inbound	76	0
Outbound	0	75
Combined	76	75

Total Passengers	151
Daily Scheduled Trips	102
Ridership Score	1.48
Ridership Rank	23rd

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Monroe Street	Olive Street
520’	450’

Olive Street



STATION ATTRIBUTES	
Route	101
Municipality	Media
Condition	On-street
Track Configuration	Single track

STOP CONFIGURATION	*Inbound*	*Outbound*
Location	Near side	Near side

RIDERSHIP	*Boards*	*Alights*
Inbound	53	2
Outbound	0	69
Combined	53	71

Total Passengers	124
Daily Scheduled Trips	102
Ridership Score	1.21
Ridership Rank	28th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Jackson Street	Veterans Square
450’	278’

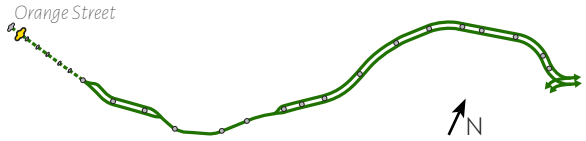
TROLLEY MODERNIZATION CHECKLIST	
Accessible Station Area	⊖
Tangent Track	✓

Notes:

No corner at this intersection features an ADA-compliant curb ramp.

Figure 140 | Olive Street, outbound stop

Figure 141 | Olive Street, inbound stop



Veterans Square

Figure 142 | Veterans Square, inbound stop

Figure 143 | Veterans Square, outbound stop

TROLLEY MODERNIZATION CHECKLIST	
Accessible Station Area	✓
Tangent Track	✓

Notes:

All four corners at this intersection feature ADA-compliant curb ramps (installed after Figure 142 was taken).

This stop is one block south of the Delaware County Courthouse.

STATION ATTRIBUTES	
Route	101
Municipality	Media
Condition	On-street
Track Configuration	Single track

STOP CONFIGURATION

	Inbound	*Outbound*
Location	Near side	Near side

RIDERSHIP

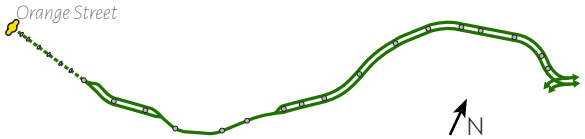
	Boards	*Alights*
Inbound	44	0
Outbound	1	66
Combined	45	66

Total Passengers	111
Daily Scheduled Trips	102
Ridership Score	1.08
Ridership Rank	31st

DISTANCE TO NEXT STATION

Inbound	*Outbound*
Olive Street	Orange Street
278’	513’

Orange Street



STATION ATTRIBUTES	
Route	101
Municipality	Media
Condition	On-street
Track Configuration	Single track

STOP CONFIGURATION	*Inbound*	*Outbound*
Location	Mid-block	Mid-block

RIDERSHIP	*Boards*	*Alights*
Inbound	131	0
Outbound	0	115
Combined	131	115

Total Passengers	246
Daily Scheduled Trips	102
Ridership Score	2.41
Ridership Rank	11th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Veterans Square	N/A
513'	N/A

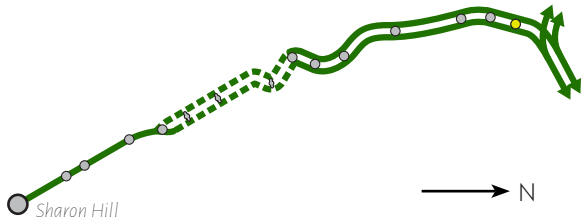
TROLLEY MODERNIZATION CHECKLIST	
Accessible Station Area	⚠
Tangent Track	✓

Notes:

This mid-block stop and layover location does not have any accessible curb ramps, and requires passengers to cross State Street at an uncontrolled location.

Figure 144 | Orange Street, passenger shelter

Figure 145 | Orange Street, terminus



Garettford

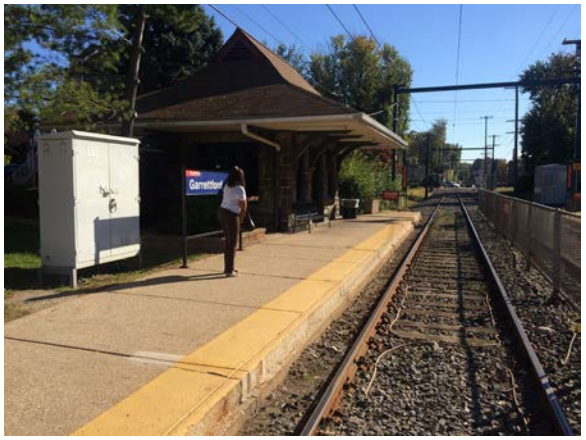


Figure 146 | Garrettford, inbound platform

Figure 147 | Garrettford, outbound platform

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⊖
Platform Length	⊖
Tangent Track	✓
Clear Platform Area	✓
Accessible Station Area	⊖
Right-of-way Width	✓

Notes:

Garrettford, the easternmost 102-only station, is located in downtown Drexel Hill.

STATION ATTRIBUTES	
Route	102
Municipality	Upper Darby
Condition	Off-street
Track Configuration	Double track

PLATFORM MEASUREMENTS	*Inbound*	*Outbound*
Location	Near side	Far side
Length	91’	83’
Maximum Width	10’	6’ 6”
Minimum Width	6’ 6”	6’ 6”

RIDERSHIP	*Boards*	*Alights*
Inbound	89	25
Outbound	25	89
Combined	114	114

Total Passengers	227
Daily Scheduled Trips	116
Ridership Score	1.96
Ridership Rank	14th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Drexel Hill Junction	Drexel Manor
1393’	605’

Drexel Manor

STATION ATTRIBUTES	
Route	102
Municipality	Upper Darby
Condition	Off-street
Track Configuration	Double track

PLATFORM MEASUREMENTS

	Inbound	*Outbound*
Location	Off-street	Off-street
Length	100'	100'
Maximum Width	10'	6' 9"
Minimum Width	6' 9"	6' 9"

RIDERSHIP

	Boards	*Alights*
Inbound	68	13
Outbound	20	61
Combined	88	74

Total Passengers	161
Daily Scheduled Trips	116
Ridership Score	1.39
Ridership Rank	24th

DISTANCE TO NEXT STATION

Inbound	*Outbound*
Garrettford	Marshall Road
605'	626'

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⚠
Platform Length	✓
Tangent Track	✓
Clear Platform Area	✓
Accessible Station Area	–
Right-of-way Width	–

Notes:

Drexel Manor station is not located at an intersection. The inbound platform is located behind single-family homes on Blanchard Road. Access to the station from Blanchard Road entrance is via stairs. The outbound platform is accessible from a cul-de-sac off of Cheswold Road. There is an at-grade pedestrian crossing across the tracks.

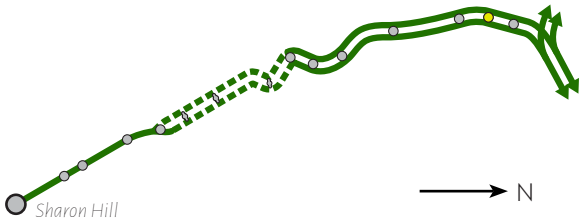
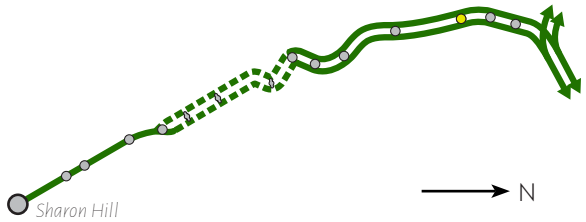


Figure 148 | Drexel Manor, outbound platform

Figure 149 | Drexel Manor, inbound platform



Marshall Road

Figure 150 | Marshall Road station

Figure 151 | Marshall Road, outbound platform (left)

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	➖
Platform Length	✔
Tangent Track	✔
Clear Platform Area	✔
Accessible Station Area	✔
Right-of-way Width	➖

Notes:

Marshall Road station closely mirrors this guide's minimum standards for modern trolley station dimensions, with the exception of platform height and a utility pole on the outbound platform.

The station's configuration and layout are instructive to designers seeking to plan an accessible station in a constrained right-of-way.

STATION ATTRIBUTES	
Route	102
Municipality	Upper Darby
Condition	Off-street
Track Configuration	Double track

PLATFORM MEASUREMENTS	*Inbound*	*Outbound*
Location	Far side	Near side
Length	134'	134'
Maximum Width	8' 6"	8' 6"
Minimum Width	8' 6"	8' 6"

RIDERSHIP	*Boards*	*Alights*
Inbound	109	12
Outbound	10	90
Combined	119	102

Total Passengers	221
Daily Scheduled Trips	116
Ridership Score	1.89
Ridership Rank	16th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Drexel Manor	Creek Road
626'	1818'

Creek Road

STATION ATTRIBUTES	
Route	102
Municipality	Upper Darby
Condition	Off-street
Track Configuration	Double track

PLATFORM MEASUREMENTS

	Inbound	*Outbound*
Location	Far side*	Near side*
Length	39'	31'
Maximum Width	6' 3"	7'
Minimum Width	6' 3"	7'

* Platforms are on a trestle approximately 20' above Creek Road.

RIDERSHIP

	Boards	*Alights*
Inbound	34	7
Outbound	11	33
Combined	46	40

Total Passengers	85
Daily Scheduled Trips	116
Ridership Score	0.73
Ridership Rank	39th

DISTANCE TO NEXT STATION

Inbound	*Outbound*
Marshall Road	Baltimore Avenue
1818'	1560'

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⚠
Platform Length	⚠
Tangent Track	✓
Clear Platform Area	⚠
Accessible Station Area	⚠
Right-of-way Width	–

Notes:

Creek Road station is one of the more challenging stations on Route 102 from an accessibility standpoint. The only platform access, both inbound and outbound, is via stairs. In addition, Creek Road itself has no sidewalks and steep slopes from the surrounding neighborhood.

The existing platforms are significantly smaller and more obstructed than this guide recommends for modern trolley stations. ADA-compliant ramps from Creek Road to the station platforms would require a very long distance to ramp up, or several switchbacks.

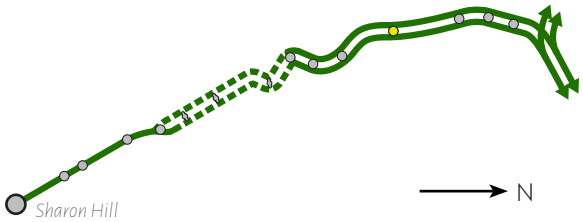
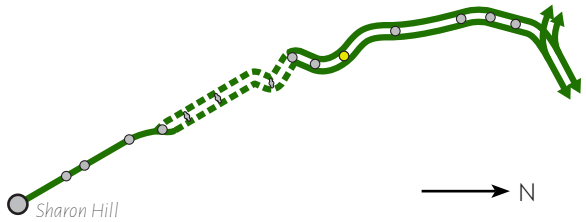


Figure 152 | Creek Road, inbound platform

Figure 153 | Creek Road, stairs to outbound platform



Baltimore Avenue

Figure 154 | Baltimore Avenue, inbound platform

Figure 155 | Baltimore Avenue, outbound platform

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	➖
Platform Length	➖
Tangent Track	➖
Clear Platform Area	✅
Accessible Station Area	✅
Right-of-way Width	✅

Notes:

This station has high ridership, and is located on a busy commercial corridor.

Tracks at the station area are slightly curved near the Baltimore Avenue roadway. Extending the platforms northwestward, where the track is straighter, would likely solve this problem.

Transfers:

Bus Route 109.

STATION ATTRIBUTES	
Route	102
Municipality	Clifton Heights
Condition	Off-street
Track Configuration	Double track

PLATFORM MEASUREMENTS	*Inbound*	*Outbound*
Location	Far side	Near side
Length	117’	86’
Maximum Width	9’ 9”	7’ 6”
Minimum Width	7’ 6”	7’ 6”

RIDERSHIP	*Boards*	*Alights*
Inbound	190	80
Outbound	71	189
Combined	261	269

Total Passengers	530
Daily Scheduled Trips	116
Ridership Score	4.56
Ridership Rank	4th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Creek Road	Penn Street
1560’	920’

Penn Street

STATION ATTRIBUTES	
Route	102
Municipality	Clifton Heights
Condition	Off-street
Track Configuration	Double track

PLATFORM MEASUREMENTS	*Inbound*	*Outbound*
Location	Near side	Near side
Length	82’	82’
Maximum Width	8’ 6”	8’
Minimum Width	8’	8’

RIDERSHIP	*Boards*	*Alights*
Inbound	33	12
Outbound	7	41
Combined	40	53

Total Passengers	92
Daily Scheduled Trips	116
Ridership Score	0.79
Ridership Rank	37th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Baltimore Avenue	Springfield Road
920’	470’

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	➖
Platform Length	➖
Tangent Track	✅
Clear Platform Area	➖
Accessible Station Area	➖
Right-of-way Width	➖

Notes:

Penn Street station is located in a primarily single-family residential neighborhood. The right-of-way at the inbound platform is constrained by a playground.

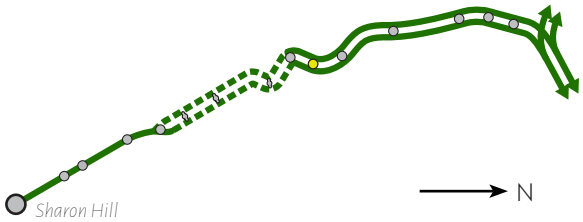
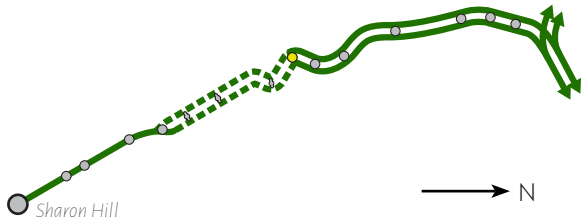


Figure 156 | Penn Street, outbound platform
Source: SEPTA

Figure 157 | Penn Street, inbound platform



Springfield Road

Figure 158 | Springfield Road, outbound platform (foreground)

Figure 159 | Springfield Road station

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⚠
Platform Length	⚠
Tangent Track	⚠
Clear Platform Area	⚠
Accessible Station Area	—
Right-of-way Width	—

Notes:

At Springfield Road, Route 102 switches from an exclusive right-of-way to mixed traffic operation.

This station is located on one of the sharpest curves on the Media/Sharon Hill lines. Platform space is constrained by a steep slope and retaining wall. These constraints make ADA-compliant platforms physically impossible to construct in their current location.

In order to construct functional, ADA-compliant platforms, the stop location for this station would need to be moved to a more tangent section of track, such as farther south on Springfield Road.

STATION ATTRIBUTES	
Route	102
Municipality	Clifton Heights
Condition	Off-street
Track Configuration	Double track

PLATFORM MEASUREMENTS	*Inbound*	*Outbound*
Location	Far side	Near side
Length	40’	53’
Maximum Width	5’ 6”	5’ 6”
Minimum Width	4’	4’

RIDERSHIP	*Boards*	*Alights*
Inbound	81	22
Outbound	21	73
Combined	102	95

Total Passengers	197
Daily Scheduled Trips	116
Ridership Score	1.69
Ridership Rank	21st

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Penn Street	Clifton-Aldan
470’	988’

Clifton-Aldan

STATION ATTRIBUTES	
Route	102
Municipality	Aldan
Condition	On-street
Track Configuration	Double track

STOP CONFIGURATION	*Inbound*	*Outbound*
Location	Near side	Far side

RIDERSHIP	*Boards*	*Alights*
Inbound	57	17
Outbound	16	57
Combined	73	74

Total Passengers	147
Daily Scheduled Trips	116
Ridership Score	1.27
Ridership Rank	26th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Springfield Road	Providence Road
988'	1580'

TROLLEY MODERNIZATION CHECKLIST	
Tangent Track	⚠
Accessible Station Area	✓

Notes:

Clifton-Aldan is one of three stations on Route 102 that are not located in dedicated SEPTA right-of-way, but run in mixed traffic. (See pp. 31-34, Focus Area: Aldan, details and station designs.)

The track curve at this station is likely to be too sharp to construct ADA-compliant platforms at the existing stop locations. In order to construct functional, ADA-compliant platforms, the stop location for this station would need to be moved to a more tangent section of track, such as farther north on Springfield Road.

Transfers:

Regional Rail: Media/Elwyn Line.

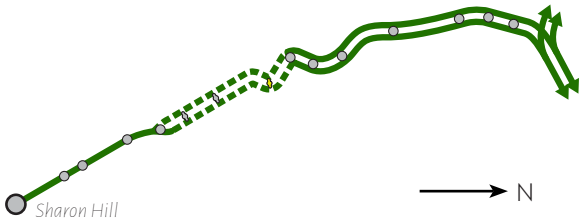
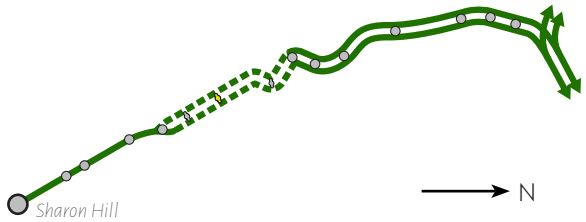


Figure 160 | Clifton-Aldan, inbound stop

Figure 161 | Clifton-Aldan, outbound stop



Providence Road

Figure 162 | Providence Road, outbound stop

Figure 163 | Providence Road, inbound stop

TROLLEY MODERNIZATION CHECKLIST	
Tangent Track	✓
Accessible Station Area	–

Notes:

Providence Road is one of three stations on Route 102 that are not located in dedicated SEPTA right-of-way, but run in mixed traffic. (See pp. 31-34, Focus Area: Aldan, details and station designs.)

The stone trolley station building at the inbound stop is used as the office of the Aldan Borough Historical Society.

Aldan Elementary school buses use the parking lane past the existing inbound stop to load and unload students.

STATION ATTRIBUTES	
Route	102
Municipality	Aldan
Condition	On-street
Track Configuration	Double track

STOP CONFIGURATION	Inbound	Outbound
Location	Far side	Near side

RIDERSHIP	Boards	Alights
Inbound	37	12
Outbound	14	57
Combined	51	69

Total Passengers	120
Daily Scheduled Trips	116
Ridership Score	1.03
Ridership Rank	33rd

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Clifton-Aldan	Magnolia Avenue
1580’	950’

Magnolia Avenue

STATION ATTRIBUTES	
Route	102
Municipality	Aldan Borough
Condition	On-street
Track Configuration	Double track

STOP CONFIGURATION	*Inbound*	*Outbound*
Location	Near side	Near side

RIDERSHIP	*Boards*	*Alights*
Inbound	23	5
Outbound	2	26
Combined	25	31

Total Passengers	56
Daily Scheduled Trips	116
Ridership Score	0.48
Ridership Rank	45th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Providence Road	North Street
950’	740’

TROLLEY MODERNIZATION CHECKLIST	
Tangent Track	✓
Accessible Station Area	–

Notes:

Magnolia Avenue is one of three stations on Route 102 that are not located in dedicated SEPTA right-of-way, but run in mixed traffic. (See pp. 31-34, Focus Area: Aldan, details and station designs.)

This stop’s ridership is among the lowest on Route 102, and is located about one eighth of a mile from North Street station.

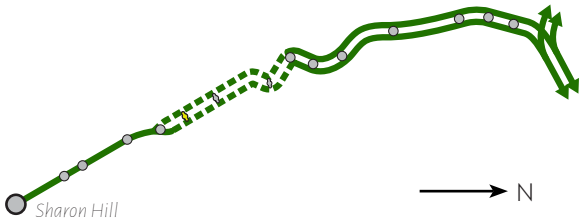
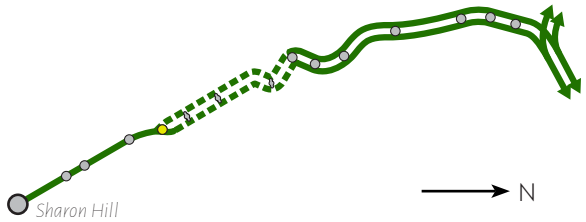


Figure 164 | Magnolia Avenue, inbound stop

Figure 165 | Magnolia Avenue, outbound stop



North Street

Figure 167 | North Street, platform (looking north)

Figure 168 | North Street, platform (looking south)

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⊖
Platform Length	✓
Tangent Track	⊖
Clear Platform Area	⊖
Accessible Station Area	⊖
Right-of-way Width	⊖

Notes:

North Street station is located alongside a switch that allows Route 102 to become a single-track operation from this point to the end of the line in Sharon Hill. The current location of the track and the switch do not provide sufficient tangent track length for an ADA-compliant station platform to be constructed. Track, switch, and/or platform placement will need to be relocated to achieve ADA compliance at this location.

STATION ATTRIBUTES	
Route	102
Municipality	Collingdale
Condition	Off-street
Track Configuration	Double-track

PLATFORM MEASUREMENTS	
Location	Far side
Length	139’
Maximum Width	22’
Minimum Width	7’ 8”

RIDERSHIP		
	Boards	*Alights*
Inbound	92	14
Outbound	18	100
Combined	110	114

Total Passengers	224
Daily Scheduled Trips	116
Ridership Score	1.93
Ridership Rank	15th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Magnolia Avenue	Bartram Avenue
950’	740’

Bartram Avenue

STATION ATTRIBUTES	
Route	102
Municipality	Collingdale
Condition	Off-street
Track Configuration	Single track

PLATFORM MEASUREMENTS

	Inbound	*Outbound*
Location	Far side	Near side
Length	88’	87’
Maximum Width	8’ 10”	7’
Minimum Width	6’	6’

RIDERSHIP

	Boards	*Alights*
Inbound	47	7
Outbound	4	43
Combined	51	50

Total Passengers	101
Daily Scheduled Trips	114
Ridership Score	0.88
Ridership Rank	35th

DISTANCE TO NEXT STATION

Inbound	*Outbound*
North Street	Andrews Avenue
1040’	1163’

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⊟
Platform Length	⊟
Tangent Track	✓
Clear Platform Area	⊟
Accessible Station Area	⊟
Right-of-way Width	✓

Notes:

Bartram Avenue station is located on the single-track portion of Route 102 in a primarily single-family residential neighborhood.

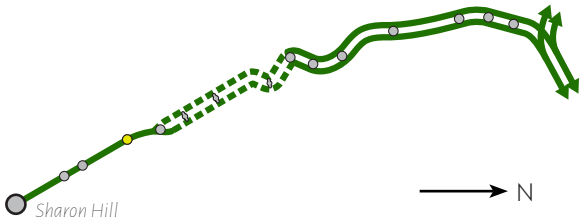


Figure 168 | Bartram Avenue, inbound platform (right)

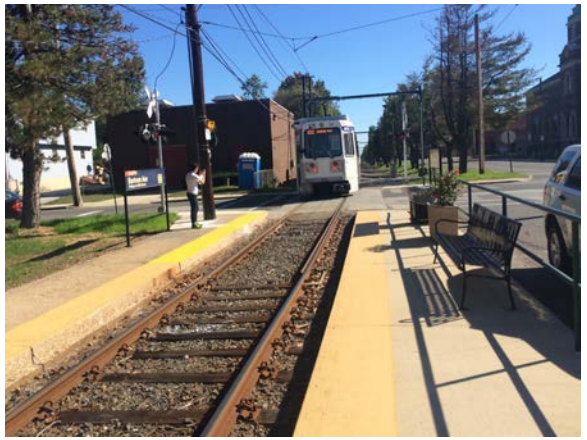
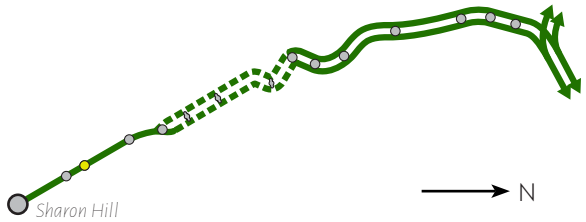


Figure 169 | Bartram Avenue, outbound platform (right)



Andrews Avenue

Figure 170 | Andrews Avenue, station (looking north)

Figure 171 | Andrews Avenue, outbound platform (foreground)

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⚠
Platform Length	▬
Tangent Track	✓
Clear Platform Area	✓
Accessible Station Area	▬
Right-of-way Width	✓

Notes:

Andrews Avenue station is located on the single-track portion of Route 102 in a primarily single-family residential neighborhood.

STATION ATTRIBUTES	
Route	102
Municipality	Collingdale
Condition	Off-street
Track Configuration	Single track

PLATFORM MEASUREMENTS	*Inbound*	*Outbound*
Location	Far side	Near side
Length	85’	74’
Maximum Width	14’	6’
Minimum Width	6’	6’

RIDERSHIP	*Boards*	*Alights*
Inbound	36	3
Outbound	3	41
Combined	39	44

Total Passengers	83
Daily Scheduled Trips	114
Ridership Score	0.72
Ridership Rank	40th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Bartram Avenue	MacDade Boulevard
1163’	465’

MacDade Boulevard

STATION ATTRIBUTES	
Route	102
Municipality	Collingdale
Condition	Off-street
Track Configuration	Single track

PLATFORM MEASUREMENTS

	Inbound	*Outbound*
Location	Far side	Near side
Length	118’	87’
Maximum Width	9’ 10”	6’
Minimum Width	6’	6’

RIDERSHIP

	Boards	*Alights*
Inbound	249	7
Outbound	7	230
Combined	256	237

Total Passengers	493
Daily Scheduled Trips	114
Ridership Score	4.32
Ridership Rank	5th

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Andrews Avenue	Sharon Hill
465’	1425’

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⊖
Platform Length	⊖
Tangent Track	✓
Clear Platform Area	⊖
Accessible Station Area	⊖
Right-of-way Width	✓

Notes:

MacDade Boulevard station is located on a busy commercial corridor.

The stretch of right-of-way between this station and Sharon Hill, where the track travels under a CSX right-of-way, floods frequently, forcing SEPTA to replace some service with shuttle buses during flood events. It is unclear whether modern trolleys’ lower floors would be effected more acutely by this circumstance. Further study into mitigating this condition is recommended.

Transfers:

Bus Route 113.

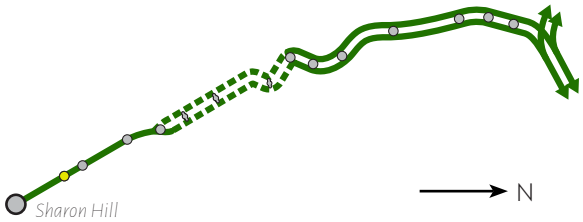
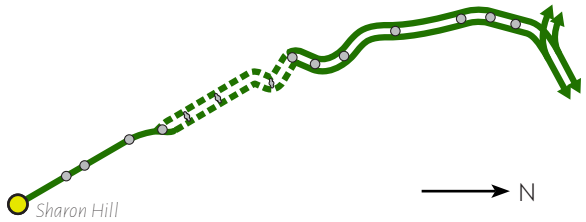


Figure 172 | MacDade Boulevard, outbound platform (foreground)

Figure 173 | MacDade Boulevard, outbound platform (left)



Sharon Hill

Figure 174 | Sharon Hill Station, platforms

Figure 175 | Sharon Hill Station, terminus

TROLLEY MODERNIZATION CHECKLIST	
Platform Width	⊖
Platform Length	✓
Tangent Track	✓
Clear Platform Area	✓
Accessible Station Area	✓
Right-of-way Width	✓

Notes:

Sharon Hill station is an end-of-line station located on a busy commercial corridor.

The stretch of right-of-way between this station and Sharon Hill, where the track travels under a CSX right-of-way, floods frequently, forcing SEPTA to replace some service with shuttle buses during flood events. It is unclear whether modern trolleys' lower floors would be affected more acutely by this circumstance. Further study into mitigating this condition is recommended.

Transfers:

Bus Route 114, Bus Route 115.

STATION ATTRIBUTES	
Route	102
Municipality	Sharon Hill
Condition	Off-street
Track Configuration	Single track

PLATFORM MEASUREMENTS	*Inbound*	*Outbound*
Location	Far side	Near side
Length	187'	140'
Maximum Width	9' 10"	6'
Minimum Width	6'	6'

RIDERSHIP	*Boards*	*Alights*
Inbound	510	0
Outbound	0	493
Combined	510	493

Total Passengers	1,003
Daily Scheduled Trips	114
Ridership Score	8.79
Ridership Rank	2nd

DISTANCE TO NEXT STATION	
Inbound	*Outbound*
Sharon Hill	N/A
1425'	N/A

EVERYBODY'S HOMETOWN
MEDIA
BOROUGH

February 20, 2018

Logan Axelson
Transportation Planner
DVRPC
190 N. Independence Mall West, 8th Floor
Philadelphia, PA 19106-1520

Re: Modern Trolley Station Design Guide

Dear Logan:

Media Borough Council reviewed the Modern Trolley Station Design Guide and Council at this time is in favor of implementing the two track design and reducing the number of stops.

If you have any questions or concerns, please don't hesitate to contact Jeff Smith at 610-566-5210, ext. 242.

Thank you.

Very truly yours,

Brian C. Hall
Council President

cc: Mayor Bob McMahon
Borough Council

JAS/kmr

MODERN TROLLEY STATION DESIGN GUIDE: SEPTA SUBURBAN TRANSIT DIVISION

Publication Number: 17010

Publication Date: May 2018

Geographic Area Covered: Delaware County, Pennsylvania
Aldan, Pennsylvania
Clifton Heights, Pennsylvania
Collingdale, Pennsylvania
Media, Pennsylvania
Nether Providence Township, Pennsylvania
Sharon Hill, Pennsylvania
Springfield Township, Pennsylvania
Upper Darby Township, Pennsylvania

Key Words: Trolley Modernization, SEPTA, Accessibility, Delaware County

Abstract: SEPTA is preparing for a once-in-a-generation replacement of its trolley fleet, Trolley Modernization. In order to comply with the Americans with Disabilities Act, and to provide effective service for its customers, SEPTA must provide new platforms and stations on its trolley routes. The *Modern Trolley Station Design Guide: SEPTA Suburban Transit Division* provides practitioners with design guidance on creating accessible stations, and introduces Trolley Modernization's benefits and constraints.

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